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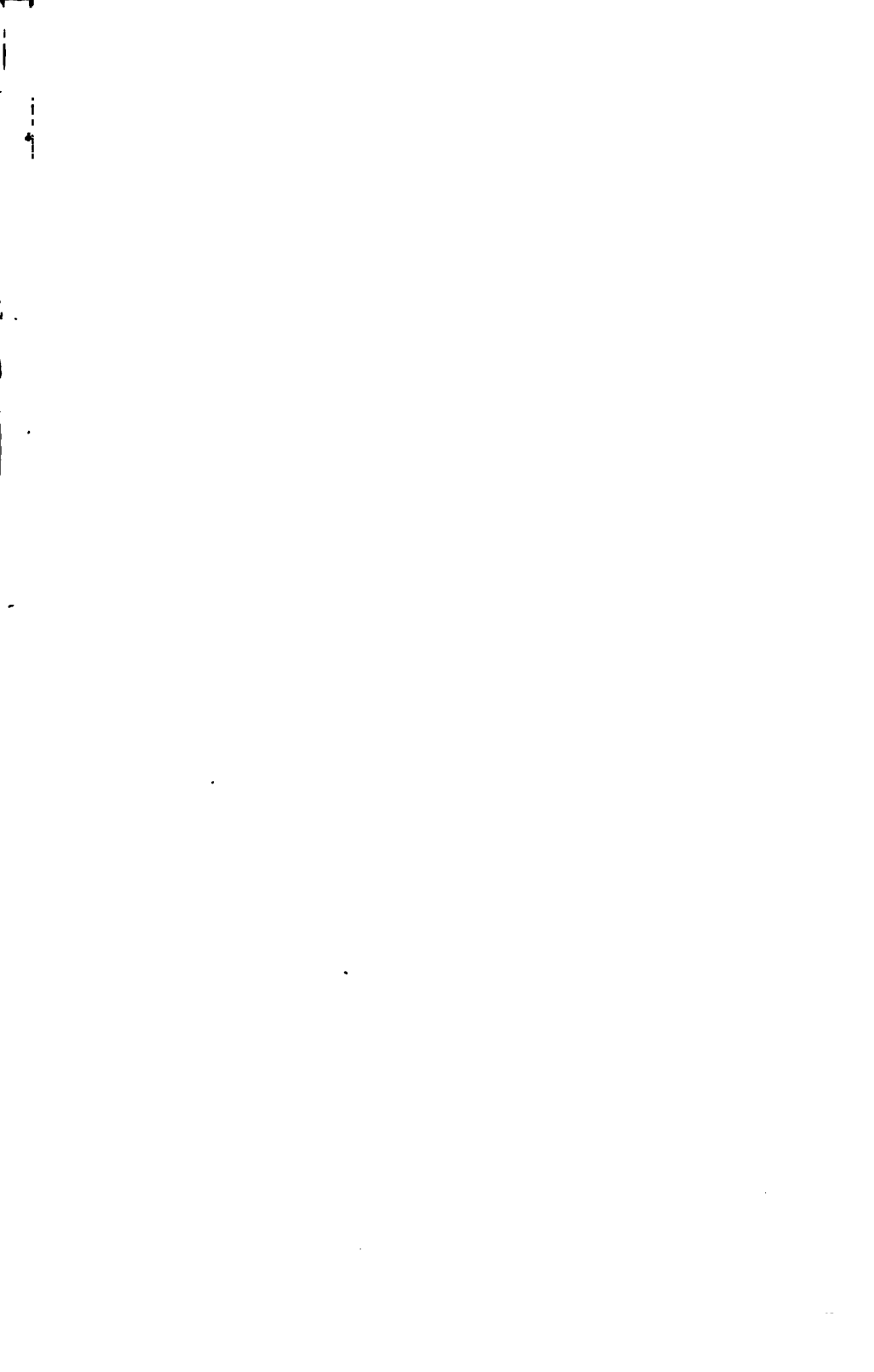
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PUBLISHED BY

**THE ROYAL
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OF
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VOLUME THE FIFTY-FOURTH.

**LONDON:
LONGMANS, GREEN, READER, AND DYER,
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1871.

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1871.



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FELLOWS OF THE SOCIETY APPOINTED BY
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FOR THE SESSION OF 1871-72.

BALLARD, EDWARD, M.D.
BARCLAY, ANDREW WHYTE, M.D.
BARNES, ROBERT, M.D.
BARWELL, RICHARD.
CALLENDER, GEORGE WILLIAM.
CLARK, FREDERICK LE GROS.
CRITCHETT, GEORGE.
DICKINSON, WILLIAM HOWSHIP, M.D.
FERGUSSON, SIR WILLIAM, BART., F.R.S.
FORSTER, JOHN COOPER.
FOX, WILSON, M.D.
GREENHOW, EDWARD HEADLAM, M.D., F.R.S.
HABERSHON, SAMUEL OSBORNE, M.D.
HARLEY, JOHN, M.D.
HAWKINS, CÆSAR HENRY, F.R.S.
HEWETT, PRESCOTT GARDNER.
HEWITT, GRAILY, M.D.
HOLTHOUSE, CARSTEN.
MARSHALL, JOHN, F.R.S.
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OLDHAM, HENRY, M.D.
PAGET, SIR JAMES, D.C.L., F.R.S.
PAVY, FREDERICK WILLIAM, M.D., F.R.S.
POWER, HENRY.
PRIESTLEY, WILLIAM OVEREND, M.D.
RADCLIFFE, CHARLES BLAND, M.D.
REES, GEORGE OWEN, M.D., F.R.S.
SIBSON, FRANCIS, M.D., F.R.S.
SIEVEKING, EDWARD HENRY, M.D.
SIMON, JOHN, D.C.L., F.R.S.
SMITH, SPENCER.
WEBER, HERMANN, M.D.
WEST, CHARLES, M.D.
WOOD, JOHN, F.R.S.

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FROM ITS FORMATION.

ELECTED

- 1805. WILLIAM SAUNDERS, M.D.
- 1808. MATTHEW BAILLIE, M.D.
- 1810. SIR HENRY HALFORD, BART., M.D., G.C.H.
- 1813. SIR GILBERT BLANE, BART., M.D.
- 1815. HENRY CLINE.
- 1817. WILLIAM BABINGTON, M.D.
- 1819. SIR ASTLEY PASTON COOPER, BART., K.C.H., D.C.L.
- 1821. JOHN COOKE, M.D.
- 1823. JOHN ABERNETHY.
- 1825. GEORGE BIRKBECK, M.D.
- 1827. BENJAMIN TRAVERS.
- 1829. PETER MARK ROGET, M.D.
- 1831. WILLIAM LAWRENCE.
- 1833. JOHN ELLIOTSON, M.D.
- 1835. HENRY EARLE.
- 1837. RICHARD BRIGHT, M.D., D.C.L.
- 1839. SIR BENJAMIN COLLINS BRODIE, BART., D.C.L.
- 1841. ROBERT WILLIAMS, M.D.
- 1843. EDWARD STANLEY.
- 1845. WILLIAM FREDERICK CHAMBERS, M.D., K.C.H.
- 1847. JAMES MONCRIEFF ARNOTT.
- 1849. THOMAS ADDISON, M.D.
- 1851. JOSEPH HODGSON.
- 1853. JAMES COPLAND, M.D.
- 1855. CÆSAR HENRY HAWKINS.
- 1857. SIR CHARLES LOCOCK, BART., M.D.
- 1859. FREDERIC CARPENTER SKEY.
- 1861. BENJAMIN GUY BABINGTON, M.D.
- 1863. RICHARD PARTRIDGE.
- 1865. SIR JAMES ALDERSON, M.D.
- 1867. SAMUEL SOLLY.
- 1869. GEORGE BURROWS, M.D.
- 1871. THOMAS BLIZARD CURLING.

FELLOWS

OF THE

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V.P.—Vice-President.

T.—Treasurer.

S.—Secretary.

L.—Librarian.

C.—Member of Council.

The figures succeeding the words *Trans.* and *Pro.* show the number of Papers which have been contributed to the Transactions or Proceedings by the Fellow to whose name they are annexed. *Sci. Com.* is attached to the names of those who have served on the Scientific Committees of the Society.

OCTOBER, 1871.

Those marked thus (†) have paid the Composition Fee in lieu of further annual subscriptions.

Amongst the non-residents, those marked thus (*) are entitled by composition to receive the Transactions.

Elected

- 1869 **ABERCROMBIE, JAMES, jun., M.D.,** Cape Town, Cape of Good Hope.
- 1846 ***ABERCROMBIE, JOHN, M.D.,** Physician to the Cheltenham General Hospital, 13, Suffolk-square, Cheltenham.
- 1851 ***ACLAND, HENRY WENTWORTH, M.D., F.R.S.,** Honorary Physician to H.R.H. the Prince of Wales; Physician to the Radcliffe Infirmary; Regius Professor of Medicine, and Clinical Professor in the University of Oxford.
- 1847 **ACOSTA, ELISHA, M.D.,** 24, Rue de Luxembourg, St. Honoré, Paris.

Elected

- 1842 ACTON, WILLIAM, 17, Queen Anne street, Cavendish square.
Trans. 1.
- 1852 ADAMS, WILLIAM, Surgeon to the Royal Orthopædic Hospital; 5, Henrietta street, Cavendish square,
Trans. 2.
- 1867 AIKIN, CHARLES ARTHUR, 7, Clifton place, Hyde park.
- 1837 *AINSWORTH, RALPH FAWSETT, M.D., Consulting Physician to the Manchester Royal Infirmary; Cliff Point, Lower Broughton, Manchester.
- 1839 ALCOCK, SIR RUTHERFORD, K.C.B., K.C.T., K.T.S., D.C.L., H.M.'s Envoy Extraordinary at the Court of Pekin.
Trans. 1.
- 1826 ALDERSON, SIR JAMES, M.D., D.C.L., F.R.S., Consulting Physician to St. Mary's Hospital; 17, Berkeley square. S. 1829. C. 1848. T. 1849. V.P. 1852-3. P. 1865-6.
Trans. 3.
- 1843 ALDIS, CHARLES JAMES BEBBIDGE, M.D., Medical Officer of Health for St. George's, Hanover square; Senior Physician to the Surrey Dispensary; and Physician to the St. Paul and St. Barnabas Dispensary; 45B, Chester Square. *Trans. 2.*
- 1850 ALEXANDER, CHARLES REVANS, Surgeon to the Royal Infirmary for Diseases of the Eye; 6, Cork street, Bond street.
- 1866 ALBUTT, THOMAS CLIFFORD, M.A. and M.D., F.L.S., Lecturer on the Practice of Physic at the Leeds School of Medicine, and Physician to the Leeds General Infirmary; 38, Park square, Leeds. *Trans. 3.*
- 1869 ALLEN, PETER, M.D., Aural Surgeon to St. Mary's Hospital; 117, Harley street, Cavendish square.
- 1863 ALTHAUS, JULIUS, M.D., Physician to the Infirmary for Epilepsy and Paralysis; 18, Bryanston street, Portman square. *Trans. 2.*
- 1862 ANDREW, EDWIN, M.D., Windsor House, Castle street, Shrewsbury.
- 1862 ANDREW, JAMES, M.D., Physician to, and Lecturer on Medicine at, St. Bartholomew's Hospital; 22, Harley street, Cavendish square.

Elected

- 1820 ANDREWS, THOMAS, M.D., Norfolk, Virginia.
- 1867 ANSTIE, FRANCIS EDMUND, M.D., Senior Assistant-Physician and Lecturer on Medicine at the Westminster Hospital; 16, Wimpole street, Cavendish square.
- 1870 ARNOTT, HENRY, Assistant-Surgeon to St. Thomas's Hospital; 6, Nottingham place, Marylebone road.
- 1819 †ARNOTT, JAMES MONCRIEFF, F.R.S., Chapel House, Lady Bank, Fifeshire. L. 1826-8. V.P. 1832-3. T. 1835-40. C. 1846, 1855-6. P. 1847-8. *Trans.* 8.
- 1817 †ASHBURNER, JOHN, M.D., F.L.S., 161A, Piccadilly. C. 1821, 1830-31.
- 1851 ASHTON, THOMAS JOHN, Consulting Surgeon to the St. Marylebone Infirmary; 31, Cavendish square.
- 1836 BAIRD, ANDREW WOOD, M.D., Physician to the Dover Hospital; 7, Camden crescent, Dover, Kent.
- 1851 *BAKER, ALFRED, Surgeon to the Birmingham General Hospital; 20A, Temple row, Birmingham.
- 1865 BAKER, WILLIAM MORRANT, Assistant Surgeon to, and Lecturer on Anatomy and Physiology, and Warden of the College at, St. Bartholomew's Hospital. *Trans.* 2.
- 1869 BAKEWELL, ROBERT HALL, M.D., Medical Officer of Health; Trinidad, West Indies; (Waverley villas, Hendon).
- 1839 †BALFOUR, THOMAS GRAHAM, M.D., F.R.S., Deputy Inspector-General of Hospitals; 6, Whitehall yard. C. 1852-3. V.P. 1860-1. *Trans.* 2.
- 1848 BALLARD, EDWARD, M.D., Inspector under the Privy Council; 7, Compton terrace, Islington. *Trans.* 5.
- 1849 BALLARD, THOMAS, M.D., 10, Southwick place, Hyde park square.
- 1866 *BANKS, JOHN THOMAS, M.D., Physician to Richmond, Whitworth, and Hardwicke Hospitals; Consulting Physician to the Coombe Hospital; 10, Merrion square east, Dublin.
- 1847 BARCLAY, ANDREW WHYTE, M.D., Physician to, and Lecturer on Medicine at, St. George's Hospital; Medical Officer of Health for Chelsea; 23A, Bruton street, Berkeley square. S. 1857-60. L. 1861-2. C. 1865-6. *Trans.* 2.

Elected

- 1862 BARKER, EDGAR, jun., 21, Hyde park street.
- 1833 †BARKER, THOMAS ALFRED, M.D., Consulting Physician to St. Thomas's Hospital; 27, Wimpole street. C. 1844-5. V.P. 1853-4. T. 1860-2. *Trans.* 6.
- 1861 BARNES, ROBERT, M.D., Obstetric Physician to, and Lecturer on Midwifery at, St. Thomas's Hospital; Examiner in Midwifery at the University of London; 31, Grosvenor street. *Trans.* 4.
- 1864 BARRATT, JOSEPH GILLMAN, M.D., 8, Cleveland gardens, Bayswater.
- 1840 BARROW, BENJAMIN, Surgeon to the Royal Isle of Wight Infirmary; Southlands, Ryde, Isle of Wight.
- 1859 BARWELL, RICHARD, Surgeon to, and Lecturer on Anatomy at, the Charing Cross Hospital; 32, George street, Hanover square. *Trans.* 1.
- 1844 BASHAM, WILLIAM RICHARD, M.D., *Treasurer*, Senior Physician to the Westminster Hospital; 17, Chester street, Belgrave square. S. 1852-4. C. 1860-1. V.P. 1864-5. T. 1871. *Trans.* 2.
- 1868 BASTIAN, HENRY CHARLTON, M.A., M.D., F.R.S., Professor of Pathological Anatomy in University College, London, and Physician to University College Hospital; 20, Queen Anne street, Cavendish square. *Trans.* 1.
- 1862 BEALE, LIONEL SMITH, M.B., F.R.S., Professor of Pathological Anatomy in King's College, London, and Physician to King's College Hospital; 61, Grosvenor street. *Trans.* 1.
- 1860 BEALEY, ADAM, M.D., M.A., Camb., Birch Lea, Harrogate.
- 1841 BEAMAN, GEORGE, M.D., 3, Henrietta street, Covent garden.
- 1856 BEARDSLEY, AMOS, F.L.S., Bay villa, Grange-over-Sands, Lancashire.
- 1865 BEATTIE, HENRY, M.D., 5, Albert square, Commercial road east.

Elected

- 1836 **BRAUMONT, WILLIAM RAWLINGS**, Consulting Surgeon to the Toronto General Hospital; Toronto, Canada West. *Trans.* 3.
- 1840 †**BEEVOR, CHARLES**, 129, Harley street, Cavendish square.
- 1858 **BEGLEY, WILLIAM CHAPMAN, M.D.**, Middlesex County Lunatic Asylum, Hanwell.
- 1819 †**BELL, THOMAS, F.R.S., F.L.S.**, The Wakes, Selborne, Hants. C. 1832-3. V.P. 1854. *Trans.* 1.
- 1847 **BENNET, JAMES HENRY, M.D.**, The Ferns, Weybridge, and Mentone.
- 1845 **BERRY, EDWARD UNWIN**, 76, Gower street, Bedford square.
- 1820 **BERTIN, STEPHEN**, Paris.
- 1865 ***BICKERSTETH, EDWARD ROBERT**, Surgeon to the Liverpool Royal Infirmary, and Lecturer on Clinical Surgery in the Liverpool Royal Infirmary School of Medicine; 2, Rodney street, Liverpool.
- 1815 †**BILLING, ARCHIBALD, M.D., F.R.S.**, Member of the Senate of the University of London; 6, Grosvenor gate. C. 1825. V.P. 1828-9.
- 1854 **BIRD, PETER HINCKES, F.L.S.**, 1, Norfolk square, Hyde park.
- 1856 **BIRD, WILLIAM**, Surgeon to the West London Hospital; Bute House, Hammersmith.
- 1849 **BIRKETT, EDMUND LLOYD, M.D.**, Physician to the City of London Hospital for Diseases of the Chest; 48, Russell square. C. 1865-6.
- 1851 **BIRKETT, JOHN, F.L.S.**, *Treasurer*, Surgeon to, and Lecturer on Surgery at, Guy's Hospital; Examiner in Surgery at the University of London; 59, Green street, Grosvenor square. L. 1856-7. S. 1863-5. C. 1867-8. T. 1870-71. *Trans.* 8. *Sci. Com.*
- 1866 **BISHOP, EDWARD, M.D.**, Cintra park, Upper Norwood.
- 1843 **BLACK, PATRICK, M.D.**, Physician to, and Lecturer on Medicine at, St. Bartholomew's Hospital; 11, Queen Anne street, Cavendish square. C. 1856. V.P. 1866. T. 1869-70.

Elected

- 1847 BLACKMAN, GEORGE C., M.D., Professor of Surgery in the Medical College of Ohio; New York, U.S.
- 1840 BLAKISTON, PEYTON, M.D., F.R.S., St. Leonard's-on-Sea.
- 1865 BLANCHET, HILARION, Examiner to the College of Physicians and Surgeons, Lower Canada; 6, Palace street, Quebec, Canada east.
- 1865 BLANDFORD, GEORGE FIELDING, M.D., Lecturer on Psychological Medicine at St. George's Hospital; 71, Grosvenor street.
- 1867 BLOXAM, JOHN ASTLEY, Surgical Registrar to St. Bartholomew's Hospital; Junior Surgeon to the West London Hospital; 8, George street, Hanover square.
- 1823 BOJANUS, LOUIS HENRY, M.D., Wilna.
- 1846 BOSTOCK, JOHN ASHTON, C.B., *Vice-President*, Hon. Surgeon to H.M. the Queen; Surgeon-Major Scots Fusilier Guards; 54, Chester square, Belgravia. C. 1861-2. V.P. 1870-71. *Sci. Com.*
- 1869 BOURNE, WALTER, M.D., 1, Clifton villas, Manningham lane, Bradford.
- 1870 *BOWLES, ROBERT LEAMON, M.D., 8, West terrace, Folkestone.
- 1841 BOWMAN, WILLIAM, F.R.S., F.L.S., Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 5, Clifford street, Bond street. C. 1852-3. V.P. 1862. *Trans.* 3.
- 1867 *BRETT, ALFRED T., M.D., Watford, Herts.
- 1867 BRIDGEWATER, THOMAS, M.B. Lond., Harrow-on-the-Hill, Middlesex.
- 1868 BROADBENT, WILLIAM HENRY, M.D., Physician to, and Joint Lecturer on Medicine at, St. Mary's Hospital; Physician to the London Fever Hospital; 44, Seymour street, Portman square.
- 1851 BRODHURST, BERNARD EDWARD, F.L.S., Surgeon to the Orthopædic Department of, and Lecturer on Orthopædic Surgery at, St. George's Hospital, and Assistant-Surgeon to the Royal Orthopædic Hospital; 20, Grosvenor street. C. 1868-9. *Trans.* 2. *Pro.* 1.

Elected

- 1844 †BROOKE, CHARLES, M.A., F.R.S., *Librarian*, Consulting Surgeon to the Westminster Hospital; 16, Fitzroy square. C. 1855. L. 1866-71.
- 1857 *BROWN, ROBERT, Surgeon to the Cumberland Infirmary, 5, Devonshire street, Carlisle.
- 1860 BROWN-SEQUARD, CHARLES EDOUARD, M.D., F.R.S., late Professor of Physiology and Pathology, Massachusetts Medical College, Harvard University, Boston, U.S.; Professor of Comparative Pathology to the Faculty of Medicine, Paris; Rue Gay-Lussac, 28, Paris. *Sci. Com.*
- 1851 BROWNE, ALEXANDER, M.D., Twynholm, Kircudbright.
- 1867 BRUNJES, MARTIN, 42, Brook street, Grosvenor square.
- 1871 BRUNTON, THOMAS LAUDER, M.D., Casualty Physician to St. Bartholomew's Hospital; 23, Davies street, Berkeley square.
- 1860 BRYANT, THOMAS, Surgeon to Guy's Hospital; 2, Finsbury square. *Trans.* 7; *Pro.* 1. *Sci. Com.*
- 1855 BRYANT, WALTER JOHN, L.R.C.P. Edinb.; 23A, Sussex square, Hyde park gardens.
- 1823 BUCHANAN, B. BARTLET, M.D.
- 1864 BUCHANAN, GEORGE, M.D., Medical Inspector for the Privy Council; 24, Nottingham place.
- 1864 BUCKLE, FLEETWOOD, M.D., Royal Naval Hospital, Haslar; Gosport, Hants.
- 1839 BUDD, GEORGE, M.D., F.R.S., Consulting Physician to the 'Dreadnought' Seamen's Hospital; Ashleigh, Barnstaple. C. 1846-7. V.P. 1857. *Trans.* 5.
- 1833 †BURROWS, GEORGE, M.D., F.R.S., President of the College of Physicians; Physician Extraordinary to H.M. the Queen; Consulting Physician to St. Bartholomew's Hospital; Physician to Christ's Hospital; Member of the Senate of the University of London; 18, Cavendish square. C. 1839-40, 1858-9. T. 1845-7. V.P. 1849-50. P. 1869-70. *Trans.* 2.

Elected

- 1837 †BUSK, GEORGE, F.R.S., F.L.S., Consulting Surgeon to the 'Dreadnought' Seamen's Hospital; 32, Harley street, Cavendish square. C. 1847-8. V.P. 1855. T. 1866. *Trans.* 4,
- 1871 BUTT, WILLIAM F., 12, South street, Park lane.
- 1818 BUTTER, JOHN, M.D., F.R.S., F.L.S., Physician Extraordinary to the Plymouth Royal Eye Infirmary; Windsor villa, Plymouth.
- 1868 BUZZARD, THOMAS, M.D., Physician to the National Hospital for the Paralysed and Epileptic; 56, Grosvenor street, Grosvenor square.
- 1851 *CADGE, WILLIAM, Surgeon to the Norfolk and Norwich Hospital; 24, St. Giles's street, Norwich. *Trans.* 1.
- 1861 CALLENDER, GEORGE WILLIAM, F.R.S., Surgeon to, and Lecturer on Anatomy at, St. Bartholomew's Hospital; 47, Queen Anne street, Cavendish square. *Trans.* 3. *Sci. Com.*
- 1852 *CANNEY, GEORGE, M.D., Bishop-Auckland, Darlington, Durham.
- 1847 CARLILL, JOHN BURFORD, M.D., 42, Weymouth Street, Portland place.
- 1853 CARTER, ROBERT BRUDENELL, Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. George's Hospital; Surgeon to the Royal South London Ophthalmic Hospital; 69, Wimpole street, Cavendish square, W.
- 1845 CARTWRIGHT, SAMUEL, Professor of Dental Surgery at King's College, London; Surgeon-Dentist to King's College Hospital; Consulting Surgeon to the Dental Hospital; 32, Old Burlington street. C. 1860-1. *Sci. Com.*
- 1868 CAVAFY, JOHN, M.B. Lond., Medical Registrar and Lecturer on Physiological Histology at St. George's Hospital; 13, Arlington street, Piccadilly.

Elected

- 1871 CAYLEY, WILLIAM, M.D., Assistant-Physician to, and Lecturer on Pathological Anatomy at, the Middlesex Hospital; Assistant-Physician to the London Fever Hospital; 58, Welbeck Street, Cavendish square, W.
- 1845 CHALK, WILLIAM OLIVER, 3, Nottingham terrace, York gate, Regent's Park.
- 1844 CHAMBERS, THOMAS KING, M.D., *Librarian*, Hon. Physician to H.R.H. the Prince of Wales; Consulting Physician to, and Lecturer on Medicine at, St. Mary's Hospital; Consulting Physician to the Lock Hospital; 64, Brook street, Grosvenor square. C. 1861. V.P. 1867. L. 1869-71. *Trans.* 1.
- 1859 CHANCE, FRANK, M.D., Croft Lodge, Cambridge.
- 1849 CHAPMAN, FREDERICK, Old Friars, Richmond green, Surrey.
- 1837 †CHAPMAN, HENRY THOMAS, 21, Lower Seymour street, Portman square. C. 1858.
- 1868 CHEADLE, WALTER BUTLER, M.D., Assistant-Physician to, and Lecturer on Pathology at, St. Mary's Hospital; Assistant-Physician to the Hospital for Sick Children; 2, Hyde park place, Cumberland gate.
- 1865 CHOLMELEY, WILLIAM, M.D., Physician to the Great Northern Hospital; 40, Russell square.
- 1866 CHURCH, WILLIAM SELBY, M.D., Assistant-Physician to, and Lecturer on Comparative Anatomy at, St. Bartholomew's Hospital; 2, Upper George street, Bryanston square.
- 1860 CLARK, ANDREW, M.D., Physician to, and Lecturer on Medicine at, the London Hospital; 16, Cavendish square.
- 1839 †CLARK, FREDERICK LE GROS, Surgeon to, and Lecturer on Surgery at, St. Thomas's Hospital; Examiner in Surgery at the University of London; 14, St. Thomas's street, Southwark, and Lee, Kent. S. 1847-9. V.P. 1855-6. *Trans.* 3.

Elected

- 1848 CLARKE, JOHN, M.D., Obstetric Physician to, and Lecturer on Midwifery at, St. George's Hospital; Physician to the General Lying-in Hospital; 42, Hertford street, May fair. C. 1866.
- 1866 CLARKE, WILLIAM FAIRLIE, M.A. (Oxon.). Assistant-Surgeon to the Charing Cross Hospital, and to the Central London Ophthalmic Hospital; 1, Curzon street, May fair.
- 1861 *CLARKE, WILLIAM JAMES, Surgeon to the Huddersfield Infirmary; John-William street, Huddersfield, Yorkshire.
- 1850 CLARKSON, JOSIAH, New Hall street, Birmingham. *Trans.* 1.
- 1842 CLAYTON, OSCAR MOORE PASSEY, Extra Surgeon-in-Ordinary to H.R.H. the Prince of Wales, and Surgeon-in-Ordinary to H.R.H. the Duke of Edinburgh; 5, Harley street. C. 1865.
- 1853 CLOVER, JOSEPH THOMAS, 3, Cavendish place, Cavendish square.
- 1857 COATES, CHARLES, F.R.C.P., Edinb., Physician to the Bath United General Hospital; 10, Circus, Bath.
- 1868 COCKLE, JOHN, M.D., F.L.S., Physician to the Royal Free Hospital; 7, Suffolk place, Pall Mall. *Trans.* 2.
- 1850 COHEN, DANIEL WHITAKER, M.D., South Bank, North Down lane, Bideford, Devon.
- 1818 COLE, ROBERT, F.L.S., Holybourne, Hampshire.
- 1854 COLLINS, FREDERICK, M.D., Wanstead Lodge, Essex.
- 1867 COOKE, T. C. WEEDEN, Surgeon to the Cancer Hospital; 76, Upper Berkeley street, Portman square.
- 1840 *COOKE, WILLIAM ROBERT, 2, Carlton villas, Hencroft street, Slough.
- 1865 COOPER, ALFRED, Additional Surgeon for Out-patients to the Lock Hospital; Assistant-Surgeon to St. Mark's Hospital; Junior Surgeon to the West London Hospital; 70, Jermyn street, Piccadilly.
- 1819 COOPER, GEORGE, Brentford, Middlesex.

Elected

- 1841 COOPER, GEORGE LEWIS, one of the Surgeons to the National Vaccine Institution, and Teacher of Vaccination to the Medical School of University College; Surgeon to the Bloomsbury Dispensary; 7, Woburn place, Russell square. C. 1860-1. *Trans.* 1.
- 1843 COOPER, WILLIAM WHITE, Surgeon-Oculist in Ordinary to H.M. the Queen; Consulting Ophthalmic Surgeon to St. Mary's Hospital; 19, Berkeley square. C. 1858-9.
- 1841 COOTE, HOLMES, Surgeon to, and Lecturer on Surgery at, St. Bartholomew's Hospital; 52, Margaret street, Regent street. S. 1853-4. C. 1864-5. *Trans.* 2.
- 1835 COPELAND, GEORGE FORD, 5, Bayshill villas, Cheltenham.
- 1868 CORNISH, WILLIAM ROBERT, Surgeon, Madras Army; Secretary to the Inspector-General, Indian Medical Department.
- 1860 *CORRY, THOMAS CHARLES STEUART, M.D., Surgeon to the Belfast General Dispensary; 9, Clarendon place, Belfast.
- 1839 *CORSELLIS, CHARLES CÆSAR, M.D., F.L.S., Benson, Oxon.
- 1853 CORY, WILLIAM GILLETT, M.D.
- 1847 COTTON, RICHARD PAYNE, M.D., Physician to the Hospital for Consumption and Diseases of the Chest; 46, Clarges street, Piccadilly. C. 1863.
- 1828 †COULSON, WILLIAM, F.L.S., Consulting Surgeon to St. Mary's Hospital, and to the German Hospital; 2, Frederick's place, Old Jewry, and 1, Chester terrace, Regent's park. C. 1831. L. 1832-7. V.P. 1851-2. *Trans.* 1.
- 1864 COULSON, WALTER JOHN, Surgeon to the Lock Hospital, 29, St. James's place.
- 1860 †COUPER, JOHN, Surgeon to the London Hospital; Assistant-Surgeon to the Royal London Ophthalmic Hospital; 80, Grosvenor street.

Elected

- 1862 COWELL, GEORGE, Assistant-Surgeon to the Westminster Hospital; Assistant-Surgeon to the Royal Westminster Ophthalmic Hospital; Surgeon to the Victoria Hospital for Children; 65, Belgrave road, Pimlico.
- 1841 CRAWFORD, MERVYN ARCHDALL NOTT, M.D., Wiesbaden. C. 1853-4.
- 1868 CRAWFORD, THOMAS, M.D., Deputy Inspector-General of Hospitals (India); 6, Whitehall yard.
- 1869 *CRESSWELL, PEARSON R., Dowlais, Merthyr Tydvil.
- 1847 CRITCHETT, GEORGE, Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 21, Harley street, Cavendish square. C. 1865. *Trans.* 1.
- 1868 CROFT, JOHN, Surgeon to, and Lecturer on Operative Surgery at, St. Thomas's Hospital; 61, Brook street, Grosvenor square.
- 1862 CROMPTON, SAMUEL, M.D., Physician to the Salford Royal Hospital and Dispensary; 24, St. Ann's square, Manchester.
- 1837 CROOKES, JOHN FARRAR, 5, Waterloo crescent, Dover.
- 1860 CROSS, RICHARD, M.D., 5, Queen street, Scarborough.
- 1849 *CROWFOOT, WILLIAM EDWARD, Beccles, Suffolk.
- 1851 CUMMING, JAMES CAMERON, M.D.
- 1865 CURGENVEN, J. BRENDON, 11, Craven hill gardens, Bayswater.
- 1846 CURLING, HENRY, Surgeon to the Margate Royal Sea-Bathing Infirmary, and the Ramsgate Seamen's Infirmary; Ramsgate, Kent.
- 1837 †CURLING, THOMAS BLIZARD, F.R.S., *President*, Consulting-Surgeon to the London Hospital; 39, Grosvenor street. S. 1845-6. C. 1850. T. 1854-7. V.P. 1859. P. 1871. *Trans.* 13. *Pro.* 1. *Sci. Com.*
- 1847 CURREY, JOHN EDMUND, M.D., Lismore, County Waterford.
- 1822 CUSACK, CHRISTOPHER JOHN, Chateau d'Eu, France.
- 1852 CUTLER, THOMAS, M.D., Spa, Belgium.
- 1836 *DANIEL, JAMES STOCK, Ramsgate, Kent.

Elected

- 1848 DAUBENY, HENRY, San Remo, Italy.
- 1846 DAVIES, FREDERICK, M.D., 124, Gower street, Bedford square.
- 1847 DAVIES, JOHN, M.D., Physician-Extraordinary to the Hertford General Infirmary, and Visiting Physician to the Hadham Palace Lunatic Asylum, Hertford.
- 1853 DAVIES, ROBERT COKER NASH, Rye, Sussex.
- 1852 DAVIES, WILLIAM, M.D., 18, Gay street, Bath.
- 1852 DAVIS, JOHN HALL, M.D., Physician Accoucheur to, and Lecturer on Midwifery at, the Middlesex Hospital; Physician to the Royal Maternity Charity, and Consulting Physician-Accoucheur to the St. Pancras Infirmary; 24, Harley street, Cavendish square. C. 1869-70.
- 1818 DAWSON, JAMES, Wray Castle, Windermere.
- 1847 DAY, GEORGE EDWARD, M.D., F.R.S., Emeritus Professor of Medicine in the University of St. Andrew's; Furzevell House, Torquay.
- 1867 DAY, WILLIAM HENRY, M.D., Physician to the Samaritan Free Hospital, and to the Margaret street Infirmary for Consumption; 10, Manchester square.
- 1867 DE MERIO, VICTOR, Surgeon to the Royal Free Hospital, and to the German Hospital, Dalston; 52, Brook street, Grosvenor square.
- 1846 *DENTON, SAMUEL BEST, M.D., Ivy Lodge, Hornsea, Hull.
- 1859 DICKINSON, WILLIAM HOWSHIP, M.D., Assistant-Physician to, and Lecturer on Materia Medica at, St. George's Hospital; Physician to the Hospital for Sick Children; 11, Chesterfield street, May fair. *Trans.* 10. *Sci. Com.*
- 1844 DICKSON, ROBERT, M.D., F.L.S. C. 1860.
- 1839 †DIXON, JAMES, Consulting Surgeon to the Royal London Ophthalmic Hospital, Moorfields; Consulting Ophthalmic Surgeon to the Asylum for Idiots; 29, Lower Seymour street, Portman square. L. 1849-55. V.P. 1857-8. T. 1863-4. C. 1866-7. *Trans.* 4.

Elected

- 1862 DOBELL, HORACE B., M.D., Physician to the Royal Hospital for Diseases of the Chest, City road ; 84, Harley street. *Trans.* 1.
- 1845 DODD, JOHN.
- 1857 DOUGLAS, ARCHIBALD, M.D., 8, Clifton place, Sussex square, Hyde park.
- 1863 DOWN, JOHN LANGDON HAYDON, M.D., Physician to, and Lecturer on Medicine at, the Loudon Hospital ; 39, Welbeck street, Cavendish square. *Trans.* 2.
- 1867 DRAGE, CHARLES, M.D., Hatfield, Herts.
- 1853 DRUITT, ROBERT, M.R.C.P., 37, Hertford street, May fair. *Trans.* 2.
- 1865 DRYSDALE, CHARLES ROBERT, M.D., Physician to the Farringdon Dispensary ; Assistant-Physician to the Metropolitan Free Hospital ; 99, Southampton row, Russell square.
- 1865 DUCKWORTH, DYCE, M.D., Assistant-Physician to, and Lecturer on Skin Diseases at, St. Bartholomew's Hospital ; 11, Grafton street, Bond street.
- 1845 DUFF, GEORGE, M.D., High street, Elgin.
- 1845 DUFFIN, EDWARD WILLSON, 18, Devonshire street, Portland place. *Trans.* 1.
- 1871 *DUKES, CLEMENT, M.B. and B.S., Rugby, Warwickshire.
- 1867 DUKES, M. CHARLES, M.D., Canterbury road, Thornton Heath.
- 1833 †DUNN, ROBERT, 31, Norfolk street, Strand. C. 1845-6. *Trans.* 2.
- 1861 DU PASQUIER, CLAUDIUS FRANCIS, Surgeon-Apothecary to H.M. the Queen, and to the Household of H.R.H. the Prince of Wales ; 62, Pall Mall.
- 1863 DURHAM, ARTHUR EDWARD, F.L.S., Assistant-Surgeon to, and Lecturer on Anatomy at, Guy's Hospital ; 82, Brook street, Grosvenor square. *Trans.* 3. *Sci. Com.*
- 1843 DURRANT, CHRISTOPHER MERCER, M.D., Physician to the East Suffolk and Ipswich Hospital ; Ipswich, Suffolk.

Elected

- 1839 DYER, HENRY SUMNER, M.D., Sennowe Hall, Guist, Norfolk.
C. 1854-5.
- 1836 EARLE, JAMES WILLIAM, late of Norwich.
- 1868 EASTES, GEORGE, M.B. Lond., Surgeon-Accoucheur to the
Western General Dispensary ; 5, Albion place, Hyde
park square.
- 1824 EDWARDS, GEORGE.
- 1823 EGERTON, CHARLES CHANDLER, Kendall Lodge, Epping.
- 1869 ELAM, CHARLES, M.D., Assistant Physician to the National
Hospital for the Paralysed and Epileptic ; 75, Harley
street, Cavendish square.
- 1861 *ELLIOT, ROBERT, M.D., Physician to the Carlisle Dispen-
sary ; 35, Lowther street, Carlisle.
- 1848 ELLIS, GEORGE VINER, Professor of Anatomy in University
College, London. C. 1863-4. *Trans.* 2.
- 1868 ELLIS, JAMES, M.D., 2, Langton villas, St. John's road,
Blackheath, and Infirmary, St. Pancras Workhouse.
- 1854 *ELLISON, JAMES, M.D., Surgeon-in-Ordinary to the Royal
Household, Windsor ; 14, High street, Windsor.
- 1842 ERICHSEN, JOHN ERIC, Professor of Clinical Surgery in
University College, London, and Surgeon to University
College Hospital ; 6, Cavendish place, Cavendish square.
C. 1855-6. V.P. 1868. *Trans.* 2.
- 1836 EVANS, GEORGE FABIAN, M.D., Birmingham.
- 1845 EVANS, WILLIAM JULIAN, M.D., Pinner, Middlesex.
- 1864 FAGGE, CHARLES HILTON, M.D., Assistant-Physician to, and
Lecturer on Pathological Anatomy at, Guy's Hospital ;
and Physician to the Evelina Hospital for Sick Children ;
11, St. Thomas's street, Southwark. *Trans.* 4.
- 1869 FAIRBANK, FREDERICK ROYSTON, M.D., Lynton, North
Devon.
- 1858 FALCONER, RANDLE WILBRAHAM, M.D., Physician to the
Bath United Hospital ; 22, Bennett street, Bath.
- 1862 FARQUHARSON, ROBERT, M.D.

Elected

- 1844 FABRE, ARTHUR, M.D., F.R.S., Physician-Accoucheur to H.R.H. the Princess of Wales; 12, Hertford street, May fair. C. 1857. V.P. 1864. *Sci. Com.*
- 1863 FENWICK, SAMUEL, M.D., Assistant-Physician to, and Lecturer on Histology at, the London Hospital; 29, Harley street, Cavendish square. *Trans.* 3.
- 1841 FERGUSSON, SIR WILLIAM, Bart., F.R.S., Sergeant-Surgeon to H.M. the Queen; Surgeon to King's College Hospital; 16, George street, Hanover square. C. 1849-50. V.P. 1863-4 *Trans.* 4.
- 1852 *FIELD, ALFRED GEORGE, Surgeon to St. Mary's Hospital, Brighton; 22, Denmark terrace, Montpelier road, Brighton.
- 1849 FINCHAM, GEORGE TUPMAN, M.D., Physician to, and Lecturer on Clinical Medicine at, the Westminster Hospital; 13, Belgrave road, Pimlico. C. 1871.
- 1866 FISH, JOHN CROCKETT, B.A., M.B., Camb., Physician to the Royal Hospital for Diseases of the Chest, City Road; 92, Wimpole street, Cavendish square.
- 1836 †FISHER, SIR JOHN WILLIAM, 5, Grosvenor gate. C. 1843-4.
- 1860 FITZGERALD, THOMAS GEORGE, Staff-Surgeon; 6, Whitehall yard.
- 1866 FITZPATRICK, THOMAS, M.D., M.A., Dublin; Physician to the Western General Dispensary, 30, Sussex gardens, Hyde park.
- 1842 FLETCHER, THOMAS BELL ELCOCK, M.D., Physician to the Birmingham General Hospital; 7, Waterloo street, Birmingham. *Trans.* 1.
- 1864 *FOLKER, WILLIAM HENRY, Surgeon to the North Staffordshire Infirmary; Bedford House, Hanley, Staffordshire.
- 1848 FORBES, JOHN GREGORY, 82, Oxford terrace, Hyde park. C. 1868-9. *Trans.* 2.
- 1852 †FORSTER, JOHN COOPER, Surgeon to, and Lecturer on Surgery at, Guy's Hospital; 29, Upper Grosvenor street. C. 1868-9. *Pro.* 1.

Elected

- 1865 FOSTER, BALTHAZAR WALTER, M.D., Professor of Medicine at the Queen's College, Birmingham, and Physician to the Birmingham General Hospital; 4, Old square, Birmingham, and Grosvenor house, Edgbaston.
- 1859 FOX, EDWARD LONG, M.B., Physician to the Bristol Royal Infirmary, and Lecturer on Medicine at the Bristol School of Medicine; Church house, Clifton, Gloucestershire.
- 1858 FOX, WILSON, M.D., Physician-Extraordinary to H.M. the Queen; Professor of Clinical Medicine in University College, London, and Physician to University College Hospital; 67, Grosvenor street. *Trans.* 2.
- 1843 FRASER, PATRICK, M.D. C. 1866.
- 1868 FREEMAN, WILLIAM HENRY, 29, Spring gardens.
- 1836 †FRENCH, JOHN GEORGE, Surgeon to the St. James's Infirmary; 41, Great Marlborough street, C. 1852-3.
- 1849 FRERE, ROBERT TEMPLE, M.A., F.R.C.P., 143, Harley street.
- 1846 FULLER, HENRY WILLIAM, MD., Physician to St. George's Hospital; 13, Manchester square. C. 1862. S. 1864-5. V.P. 1868-9. *Trans.* 3.
- 1864 *GAIRDNER, WILLIAM TENNANT, M.D., Professor of the Practice of Medicine in the University of Glasgow; Physician to the Glasgow Royal Infirmary; 225, St. Vincent street, Glasgow.
- 1865 GANT, FREDERICK JAMES, Surgeon to the Royal Free Hospital; 16, Connaught square, Hyde park. *Trans.* 1.
- 1867 GARLAND, EDWARD CHARLES, L.R.C.P. Edin., Yeovil, Somerset.
- 1867 GARLIKE, THOMAS W., Tulse Hill, Brixton.
- 1854 GARROD, ALFRED BARING, M.D., F.R.S., Professor of Materia Medica in King's College, London, and Physician to King's College Hospital; Examiner in Materia Medica at the University of London; 11, Harley street, Cavendish square. C. 1867. *Trans.* 8.
- 1857 GASCOYEN, GEORGE GREEN, Surgeon to the Lock Hospital; Assistant Surgeon to, and joint Lecturer on Surgery at, St. Mary's Hospital; 48, Queen Anne street, Cavendish square. S. 1866-69. C. 1871. *Trans.* 3. *Sci. Com.* 2.

Elected

- 1851 GASKOIN, GEORGE, 7, Westbourne park.
- 1819 GAULTER, HENRY.
- 1848 GAY, JOHN, Senior Surgeon to the Great Northern Hospital, and Consulting Surgeon to the Asylum for Idiots ; 10, Finsbury place south.
- 1866 GEE, SAMUEL JONES, M.D., Assistant-Physician to St. Bartholomew's Hospital ; Assistant-Physician to the Hospital for Sick Children ; 54, Harley street, Cavendish square.
- 1821 *GEORGE, RICHARD FRANCIS, 20, Marlborough buildings, Bath.
- 1858 GODFREY, BENJAMIN, M.D., Carlton House, Enfield, Middlesex.
- 1870 GODSON, CLEMENT, Surgeon-Accoucheur to the City of London Lying-in Hospital ; 13A, Finsbury square.
- 1867 GOODEVE, EDWARD, M.B., Hon. Physician to H.M. the Queen ; late Surgeon-Major, H.M.'s Bengal army.
- 1851 GOODFELLOW, STEPHEN JENNINGS, M.D., Physician to the Middlesex Hospital ; 5, Savile row, Burlington gardens. C. 1864-5. *Trans.* 2.
- 1818 GORDON, JAMES ALEXANDER, M.D., F.R.S., Pixholme, near Dorking, Surrey. C. 1828. V.P. 1829. *Trans.* 1.
- 1851 GOWLLAND, PETER YEAMES, Surgeon to St. Mark's Hospital ; 34, Finsbury square.
- 1844 GRANTHAM, JOHN, Crayford, Kent.
- 1846 GREAM, GEORGE THOMPSON, M.D., Physician-Accoucheur to H.R.H. the Princess of Wales ; 2, Upper Brook street, Grosvenor square. C. 1863.
- 1868 GREEN, THOMAS HENRY, M.D., Senior Assistant-Physician to, and Lecturer on Pathology at, Charing Cross Hospital ; 74, Wimpole street, Cavendish square.
- 1843 *GREENHALGH, ROBERT, M.D., Physician-Accoucheur to, and Lecturer on Midwifery at, St. Bartholomew's Hospital ; Consulting Physician to the Samaritan Free Hospital for Women and Children, and to the City of London Lying-in Hospital ; 72, Grosvenor street. C. 1871.

Elected

- 1860 GREENHOW, EDWARD HEADLAM, M.D., F.R.S., Examiner in Forensic Medicine at the University of London; Physician to, and Lecturer on the Practice of Medicine at, the Middlesex Hospital; and Consulting Physician to the Western General Dispensary; 14A, Manchester square. *Trans.* 2.
- 1868 GRIGG, WILLIAM CHAPMAN, M.D.; 6, Curzon street, May fair.
- 1814 GROVE, JOHN, M.D., Salisbury.
- 1852 GROVE, JOHN, Spring Grove, Hampton, Middlesex.
- 1860 GUENEAU DE MUSSY, HENRI, M.D., Physician to the French Hospital, Lisle street, Leicester square; 55, Wimpole street, Cavendish square.
- 1849 GULL, WILLIAM WITHEY, M.D., D.C.L., F.R.S., Member of the Senate of the University of London; 74, Brook street, Grosvenor square. C. 1864. *Trans.* 3.
- 1837 GULLY, JAMES MANBY, M.D., Great Malvern, Worcestershire.
- 1854 HABERSHON, SAMUEL OSBORNE, M.D., Physician to, and Lecturer on Materia Medica and Therapeutics at, Guy's Hospital; 70, Brook street, Grosvenor square. S. 1867. C. 1869-70. *Trans.* 3.
- 1849 HAILEY, HAMMETT, F.L.S., Newport Pagnell, Bucks.
- 1848 HALLEY, ALEXANDER, M.D., F.G.S., 16, Harley street, Cavendish square.
- 1870 HAMILTON, ROBERT, Surgeon to the South Hospital, Liverpool; 1, Prince's road, Liverpool.
- 1819 †HAMMERTON, THOMAS, Carlton Lawn, Carlton street, Cheltenham. C. 1829-30.
- 1838 †HANCOCK, HENRY, Surgeon to the Charing Cross Hospital; Surgeon to the Royal Westminster Ophthalmic Hospital; 76, Harley street, Cavendish square. C. 1851. V.P. 1869.
- 1848 *HARCOURT, GEORGE, M.D., Chertsey, Surrey.
- 1836 HARDING, JOHN FOSSE, Mount Sandford, Southborough, Tunbridge Wells. C. 1858-9.

Elected

- 1856 HARE, CHARLES JOHN, M.D., late Professor of Clinical Medicine in University College, London, and Physician to University College Hospital; 57, Brook street, Grosvenor square.
- 1857 HARLEY, GEORGE, M.D., F.R.S., 25, Harley street, Cavendish square. C. 1871. *Trans.* 1. *Sci. Com.* 2.
- 1864 HARLEY, JOHN, M.D., F.L.S., Assistant-Physician to, and Lecturer on Physiology at, St. Thomas's Hospital; 78, Upper Berkeley street, Portman square. *Trans.* 4.
- 1866 HARPER, PHILIP H., 30, Cambridge street, Hyde park.
- 1859 HARRIS, FRANCIS, M.D., F.L.S., Physician to St. Bartholomew's Hospital; 24, Cavendish square.
- 1870 HARRISON, REGINALD, Assistant Surgeon to the Liverpool Royal Infirmary, and Lecturer on Anatomy at the School of Medicine; 51, Rodney street, Liverpool.
- 1841 HARVEY, WILLIAM, Surgeon to the Royal Dispensary for Diseases of the Ear, and to the Freemasons' Female Charity; Aural Surgeon to the Great Northern Hospital; 2, Soho square. C. 1854.
- 1854 HAVILAND, ALFRED, late Surgeon to the Bridgewater Infirmary; 120, King Henry's road, Primrose hill.
- 1870 HAWARD, J. WARRINGTON, Assistant-Surgeon to the Hospital for Sick Children; 46, Queen Anne street, Cavendish square.
- 1828 †HAWKINS, CÆSAR HENRY, F.R.S., Sergeant-Surgeon to H.M. the Queen, and Consulting Surgeon to St. George's Hospital; 26, Grosvenor street. C. 1830-1, 1860. V.P. 1838-9. T. 1841-4. P. 1855-6. *Trans.* 12.
- 1838 †HAWKINS, CHARLES, Inspector of Anatomical Schools in London; 27, Savile row, Burlington gardens. C. 1846-7. S. 1850. V.P. 1858. T. 1861-2. *Trans.* 2.
- 1848 HAWKSLEY, THOMAS, M.D., Physician to the Margaret street Dispensary for Consumption and Diseases of the Chest; 6, Brook street, Hanover square.

Elected

- 1860 HAYWARD, HENRY HOWARD, Assistant-Surgeon Dentist to, and Lecturer on Dental Surgery at, St. Mary's Hospital; Dental Surgeon to the Hospital for Consumption, Brompton; 38, Harley street, Cavendish square.
- 1861 HAYWARD, WILLIAM HENRY, Church House, Oldbury, Worcestershire.
- 1848 *HEALE, JAMES NEWTON, M.D., Winchester, Hants.
- 1865 HEATH, CHRISTOPHER, Surgeon to University College Hospital; and Lecturer on Operative Surgery in University College, London; 9, Cavendish place, Cavendish square.
- 1850 HEATON, GEORGE, M.D., Boston, U.S.
- 1829 †HEBERDEN, THOMAS, M.D., 98, Park street, Grosvenor square.
- 1849 HENRIQUES, AMOS, M.D., Hon. Physician to the Spanish Embassy; 67, Upper Berkeley street, Portman square.
- 1821 HERBERSKI, VINCENT, M.D., Professor of Medicine in the University of Wilna.
- 1843 HEWETT, PRESCOTT GARDNER, Surgeon-Extraordinary to H.M. the Queen; Surgeon to St. George's Hospital; 1, Chesterfield street, May fair. C. 1859. V.P. 1866-7. *Trans.* 7. *Sci. Com.*
- 1855 HEWITT, GRAILY, M.D., Professor of Midwifery in University College, London, and Obstetric Physician to University College Hospital; Examiner in Midwifery at the University of London; 36, Berkeley square.
- 1853 HEWLETT, THOMAS, Surgeon to Harrow School; Harrow, Middlesex. *Trans.* 1.
- 1868 HILL, JOHN DANIEL, Surgeon to the Royal Free Hospital; Assistant Surgeon to the Royal Orthopædic Hospital; 17, Guilford street, Russell square.
- 1862 HILL, M. BERKELEY, M.B., Lond., Surgeon to University College Hospital, and Lecturer on Operative Surgery at University College, London; Surgeon for out-patients to the Lock Hospital; 14, Weymouth street, Portland place.

Elected

- 1867 HILL, SAMUEL, M.D., 22, Mecklenburgh square.
- 1842 HILLMAN, WILLIAM AUGUSTUS, 1, Argyll street, Regent street. C. 1858-9.
- 1841 †HILTON, JOHN, F.R.S., Surgeon-Extraordinary to H.M. the Queen; Consulting Surgeon to Guy's Hospital; Consulting Surgeon to the Royal General Dispensary, St. Pancras; 10, New Broad street, City. C. 1851. V.P. 1863-4. *Trans.* 4.
- 1868 HINTON, JAMES, Aural Surgeon to Guy's Hospital; 18, Savile row. *Trans.* 2.
- 1859 HIRD, FRANCIS, Surgeon to the Charing Cross Hospital, 13, Old Burlington street.
- 1861 *HOFFMEISTER, WILLIAM CARTER, M.D., Surgeon to H.M. the Queen in the Isle of Wight; Clifton House, Cowes, Isle of Wight.
- 1843 HOLDEN, LUTHER, Surgeon to St. Bartholomew's Hospital; Consulting Surgeon to the Metropolitan Dispensary; Surgeon to the Foundling Hospital; 65, Gower street, Bedford square. C. 1859. L. 1865.
- 1814 †HOLLAND, SIR HENRY, Bart., M.D., D.C.L., LL.D., F.R.S., Physician in Ordinary to H.M. the Queen; 72, Brook street, Grosvenor square. C. 1817, 1833-4. V.P. 1826, 1840. *Trans.* 1.
- 1868 HOLLIS, WILLIAM AINSLIE, M.A., M.B. Camb., Physician to Casualty Department, St. Bartholomew's Hospital; 53, Harley street, Cavendish square.
- 1861 HOLMAN, WILLIAM HENRY, M.B. Lond., 68, Adelaide road south, Hampstead.
- 1856 HOLMES, TIMOTHY, Surgeon to, and Lecturer on Surgery at, St. George's Hospital; Surgeon in Chief to the Metropolitan Police Force; Professor of Pathology and Surgery to the Royal College of Surgeons; 31, Clarges street, Piccadilly. C. 1869-70. *Trans.* 4. *Sci. Com.*
- 1846 HOLT, BARNARD WIGHT, Senior Surgeon to, and Lecturer on Clinical Surgery at, the Westminster Hospital; Medical Officer of Health for Westminster; 14, Savile row, Burlington gardens. C. 1862-63.

Elected

- 1846 HOLTHOUSE, CARSTEN, Surgeon to, and Lecturer on Surgery at, the Westminster Hospital; 3, George street, Hanover square. C. 1863.
- 1865 HOWARD, BENJAMIN, M.D., Lecturer on Operative Surgery, and Surgeon to the Long Island College Hospital, New York; 327, West 23rd street, New York.
- 1865 HOWARD, EDWARD, M.D., Oaklands, Penge, Surrey.
- 1857 HULKE, JOHN WHITAKER, F.R.S., Surgeon to, and Lecturer on Ophthalmic Surgery at, the Middlesex Hospital; Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 10, Old Burlington street. C. 1871. *Trans.* 4. *Sci. Com.*
- 1857 HULME, EDWARD CHARLES, Ophthalmic Surgeon to the Great Northern Hospital; Woodbridge road, Guildford. *Trans.* 1.
- 1844 HUMBY, EDWIN, M.D., 83, Hamilton terrace, St. John's wood. C. 1866-7.
- 1855 HUMPHRY, GEORGE MURRAY, M.D., F.R.S., Surgeon to Addenbrooke's Hospital; Professor of Human Anatomy and Physiology in the Cambridge University Medical School; Lecturer on Anatomy and Physiology to the Royal College of Surgeons; Cambridge. *Trans.* 5.
- 1866 HUNTER, CHARLES, 30, Wilton place, Belgrave square.
- 1849 HUSSEY, EDWARD LAW, Senior Surgeon to the Radcliffe Infirmary, and Consulting Surgeon to the County Lunatic Asylum and the Warneford Asylum, 8, St. Aldate's, Oxford. *Trans.* 1.
- 1856 HUTCHINSON, JONATHAN, Surgeon to, and Lecturer on Surgery at, the London Hospital; Surgeon to the Royal London Ophthalmic Hospital, Moorfields, and to the Hospital for Diseases of the Skin; 4, Finsbury Circus. C. 1870. *Trans.* 3. *Pro.* 2.
- 1820 HUTCHINSON, WILLIAM, M.D.
- 1840 †HUTTON, CHARLES, M.D., Senior Physician to the General Lying-in Hospital; 26, Lowndes street, Belgrave square. C. 1858-9.

Elected

- 1866 ILES, FRANCIS HENRY WILSON, M.D., Watford, Herts.
- 1847 IMAGE, WILLIAM EDMUND, Senior Surgeon to the Suffolk General Hospital; Bury St. Edmund's, Suffolk.
Trans. 1.
- 1856 INGLIS, CORNELIUS, M.D., 9, Duke street, Portland place.
- 1871 JACKSON, J. HUGHLINGS, M.D., Physician to the London Hospital; Physician to the National Hospital for the Paralysed and Epileptic; 3, Manchester square.
- 1841 †JACKSON, PAUL, 24, Wimpole street, Cavendish square.
C. 1862.
- 1868 JACKSON, THOMAS CARR, Surgeon to the Great Northern Hospital, and Surgeon to the National Orthopædic Hospital; 3, Weymouth street, Portland place.
- 1863 JACKSON, THOMAS VINCENT, Surgeon to the South Staffordshire General Hospital; Darlington st., Wolverhampton.
- 1841 JACOBOWICS, MAXIMILIAN MORITZ, M.D., Vienna.
- 1825 JAMES, JOHN B., M.D.
- 1839 JEFFREYS, JULIUS, F.R.S.
- 1840 *JENKS, GEORGE SAMUEL, M.D., 18, Circus, Bath.
- 1851 JENNER, SIR WILLIAM, Bart., M.D., D.C.L., F.R.S., Physician in Ordinary to H.M. the Queen, and to H.R.H. the Prince of Wales; Professor of Clinical Medicine in University College, London, and Physician to University College Hospital; 63, Brook street, Grosvenor square.
C. 1864. *Trans.* 3.
- 1851 JOHNSON, EDMUND CHARLES, Corresponding Member of the Medical and Philosophical Society of Florence, and of "l'Institut Genevois."
- 1847 JOHNSON, GEORGE, M.D., Professor of the Principles and Practice of Medicine in King's College, London, and Physician to King's College Hospital; Member of the Senate of the University of London; 11, Savile row, Burlington gardens. C. 1862-4. V.P. 1870.
Trans. 8.
- 1868 JOHNSTON, WILLIAM, M.D., 44, Princes square, Hyde park.

Elected

- 1848 JOHNSTONE, [JOHNSON], ATHOL ARCHIBALD WOOD, 20, Regency square, Brighton. *Trans.* 1.
- 1862 JONES, CHARLES HANDFIELD, M.B., F.R.S., Physician to, and Lecturer on Clinical Medicine at, St. Mary's Hospital; 49, Green street, Grosvenor square.
- 1844 †JONES, HENRY BENGE, M.A., M.D., D.C.L., F.R.S., Consulting Physician to St. George's Hospital; 84, Brook street, Grosvenor square. C. 1855-6. V.P. 1866. *Trans.* 11.
- 1835 †JONES, HENRY DERVICHE, 12, Norfolk crescent, Oxford square. C. 1854-5.
- 1837 †JONES, THOMAS WILLIAM, M.D., 55, St. John's Park, Upper Holloway. C. 1858.
- 1859 JONES, WILLIAM PRICE, M.D., Claremont road, Surbiton, Kingston.
- 1865 JORDAN, FURNEAUX, Surgeon to the Queen's Hospital, and Professor of Surgery at the Queen's College, Birmingham; 16, Colmore row, Birmingham.
- 1816 *KAUFFMANN, GEORGE HERMANN, M.D., Hanover.
- 1848 *KENDELL, DANIEL BURTON, M.D., Heath House, Wakefield, Yorkshire.
- 1847 KEYSER, ALFRED, 21, Norfolk crescent, Oxford square.
- 1857 KIALLMARK, HENRY WALTER, 66, Princes square, Baywater.
- 1851 KINGDON, JOHN ABERNETHY, Surgeon to the City of London Truss Society, and to the City Dispensary; 2, New Bank buildings, Lothbury. C. 1866-7. *Trans.* 1. *Sci. Com.*
- 1855 LANE, JAMES ROBERT, Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital; Surgeon to the Lock Hospital; 2, Berkeley street, Piccadilly. C. 1870. *Trans.* 1.
- 1840 †LANE, SAMUEL ARMSTRONG, Consulting Surgeon to, and Lecturer on Clinical Surgery at, St. Mary's Hospital; Consulting Surgeon to the Lock Hospital; 2, Berkeley street, Piccadilly. C. 1849-50. V.P. 1865.

Elected

- 1865 LANGTON, JOHN, Assistant-Surgeon to, and Demonstrator of Anatomy at, St. Bartholomew's Hospital; Surgeon to the City of London Truss Society; 18, Harley street, Cavendish square.
- 1841 *LASHMAR, CHARLES, M.D., 83, North End, Croydon, Surrey.
- 1862 LATHAM, PETER WALLWORK, M.A., M.B., Physician to Addenbrooke's Hospital, Cambridge; Examiner for Medical Degrees in Cambridge University; 17, Trumpington street, Cambridge.
- 1816 LAWRENCE, G. E.
- 1840 LAYCOCK, THOMAS, M.D., F.R.S.E., Physician-in-Ordinary to H.M. the Queen in Scotland, Professor of the Practice of Medicine and of Clinical Medicine, and Lecturer on Psychology and Mental Diseases in the University of Edinburgh; 13, Walker street, Edinburgh.
- 1843 *LEACH, JESSE, Moss Hall, Heywood, Lancashire.
- 1868 LEARED, ARTHUR, M.D., Senior Physician to the Great Northern Hospital; 12, Old Burlington street.
- 1822 LEDSAM, JOHN JOSEPH, M.D., 17, Esplanade, Scarborough, Yorkshire.
- 1843 LEE, HENRY, Surgeon to St. George's Hospital; 9, Savile row, Burlington gardens. C. 1856-7. L. 1863-4. V.P. 1868-9. *Trans.* 11. *Pro.* 1. *Sci. Com.*
- 1822 †LEE, ROBERT, M.D., F.R.S., Corresponding Member of the Academy of Medicine, Paris; 4, Savile row, Burlington gardens. C. 1829, 1834. S. 1830-3. V.P. 1835. *Trans.* 27.
- 1869 LEGG, JOHN WICKHAM, M.D., Physician to Casualty Department, St. Bartholomew's Hospital; 8, Old Cavendish street.
- 1836 LEIGHTON, FREDERICK, M.D., Frankfort-on-the-Maine.
- 1806 LIND, JOHN, M.D.
- 1870 LIVINGSTON, JOHN, M.D., New Barnet, Hertfordshire.
- 1819 LLOYD, ROBERT, M.D.

Elected

- 1820 LOCHER, J. G., M.C.D., Town Physician of Zurich.
Trans. 2.
- 1824 †LOCOCK, SIR CHARLES, Bart., M.D., D.C.L., F.R.S.,
Member of the Senate of the University of London;
26, Hertford street, May fair. C. 1826. V.P. 1841.
P. 1857-8. *Trans.* 1.
- 1846 LOMAX, HENRY THOMAS, Surgeon to the County Police;
St. Mary's Grove, Stafford.
- 1860 LONGMORE, THOMAS, C.B., Hon. Surgeon to H.M. the
Queen, Deputy Inspector-General, and Professor of
Clinical and Military Surgery, Army Medical School,
Royal Victoria Hospital, Netley, Southampton; Wool-
ston Lawn, Woolston, Hants. *Trans.* 2.
- 1836 LÖWENFELD, JOSEPH S., M.D., Berbice.
- 1871 LOWNDS, THOMAS MACKFORD, M.D., late Professor of
Anatomy and Physiology at Grant Medical College,
Bombay; Egham Hill, Surrey.
- 1852 LUKE, JAMES, F.R.S., Consulting Surgeon to the London
Hospital; Woolley Lodge, Maidenhead Thicket, Berks.
C. 1858. *Trans.* 4.
- 1857 LYON, FELIX WILLIAM, M.D., 18, Buccleugh place,
Edinburgh.
- 1867 MABERLY, GEORGE FREDERICK, Leamington, Warwick-
shire.
- 1867 MAC CORMAC, WILLIAM, M.A., M.D., Assistant Surgeon to
St. Thomas's Hospital; 13, Harley street.
- 1862 *M'DONNELL, ROBERT, M.D., F.R.S., Surgeon to Steevens'
Hospital; 14, Lower Pembroke street, Dublin.
Trans. 1.
- 1846 M'EWEN, WILLIAM, M.D., Surgeon to Chester Castle; 27,
Nicholas street, Chester.
- 1866 MACGOWAN, ALEXANDER THORBUEN, Kingswood park, near
Bristol.
- 1823 †MACILWAIN, GEORGE, Consulting Surgeon to the Finsbury
Dispensary, and to the St. Anne's Society's Schools;
Matching, Harlow, Essex. C. 1829-30. V.P. 1848.
Trans. 1,

Elected

- 1822 MACINTOSH, RICHARD, M.D.
- 1859 *M'INTYRE, JOHN, M.D., Odiham, Hants.
- 1854 *MACKINDER, DRAPER, M.D., Consulting Surgeon to the Dispensary, Gainsborough, Lincolnshire.
- 1860 MACLEAN, JOHN, M.D., 24, Portman street, Portman square.
- 1849 MACLURE, DUNCAN MACLACHLAN, M.B., Lecturer on Physiology at the Westminster Hospital; Assistant-Physician to the National Hospital for the Paralysed and Epileptic; 34, Harley street, Cavendish square.
- 1842 MACNAUGHT, JOHN, M.D., 25, Bedford street, Liverpool.
- 1855 MARCET, WILLIAM, M.D., F.R.S. 1, Place Massena, Nice. C. 1871. *Trans.* 2. *Sci. Com.*
- 1867 MARSH, F. HOWARD, Demonstrator of Anatomy at St. Bartholomew's Hospital; 38, Guilford street, Russell square.
- 1838 MARSH, THOMAS PARR, M.D.
- 1851 MARSHALL, JOHN, F.R.S., Professor of Surgery in University College, London, and Surgeon to University College Hospital; 10, Savile row, Burlington gardens. C. 1866. *Trans.* 2.
- 1841 MARTIN, SIR JAMES RANALD, C.B., F.R.S., Examining Medical Officer to the Secretary of State for India in Council; President of Medical Board for Examination of Officers of H.M.'s Indian Medical Service; Inspector General of Hospitals; 37, Upper Brook street, Grosvenor square. C. 1853. V.P. 1862.
- 1853 MASFEN, WILLIAM EDWARD, Surgeon to the Staffordshire General Infirmary; Stafford.
- 1864 MASON, FRANCIS, Assistant-Surgeon to, and Lecturer on Anatomy at, St. Thomas's Hospital; 10, Conduit street, Regent street. *Trans.* 1.
- 1869 MAYO, CHARLES, M.B.
- 1839 MEADE, RICHARD HENRY, Consulting Surgeon to the Bradford Infirmary; Bradford, Yorkshire. *Trans.* 1

Elected

- 1870 MEADOWS, ALFRED, M.D., Physician Accoucheur to, and Lecturer on Midwifery at, St. Mary's Hospital; Physician to the Hospital for Women, Soho square; Physician Accoucheur to the General Lying-in-Hospital, York road; 27, George street, Hanover square.
- 1865 MEDWIN, AARON GEORGE, M.D., Dental Surgeon to the Royal Kent Dispensary, 11, Montpellier row, Blackheath, Kent.
- 1867 MEREDYTH, COLOMIATI, M.D., 76, Margaret street, Cavendish square.
- 1837 MERRIMAN, SAMUEL WILLIAM JOHN, M.D., Consulting Physician-Accoucheur to the Westminster General Dispensary; Marlboro' House, Sandown, Isle of Wight. C. 1851-2. *Trans.* 1.
- 1852 MERRYWEATHER, JAMES, Consulting Surgeon to the National Dental Hospital; 25, Brook street, Grosvenor square.
- 1847 MERYON, EDWARD, M.D., F.G.S., 14, Clarges street, Piccadilly. L. 1859-60. C. 1864-5. V.P. 1868-9. *Trans.* 2.
- 1815 MEYER, AUGUSTUS, M.D., St. Petersburg.
- 1868 MICHELL, WILLIAM DANIEL, 38, Delancey street, Gloucester gate, Regent's park.
- 1840 MIDDLEMORE, RICHARD, Consulting Surgeon to the Birmingham Eye Hospital; 19, Temple row, Birmingham.
- 1854 MIDDLESHP, EDWARD ARCHIBALD.
- 1818 *MILLER, PATRICK, M.D., F.R.S.E., Consulting Physician to the Devon and Exeter Hospital, and to St. Thomas's Hospital for Lunatics; the Grove, Exeter, Devonshire.
- 1863 MONRO, HENRY, M.D., Physician to St. Luke's Hospital; 13, Cavendish square. C. 1868.
- 1844 MONTEFIORE, NATHANIEL, 36, Hyde park gardens.
- 1836 MOORE, GEORGE, M.D., Priory Houses, Hastings, Sussex.
- 1861 MOREHEAD, CHARLES, M.D., Hon. Surgeon to H.M. the Queen; Deputy-Inspector General of Hospitals; 59, Melville street, Edinburgh.
- 1857 MORGAN, JOHN, 3, Sussex place, Hyde park gardens. *Trans.* 1.

Elected

- 1861 MORGAN, JOHN EDWARD, M.B., Physician to the Manchester Royal Infirmary, and Lecturer on Medicine at the Manchester Royal School of Medicine; 1, St. Peter's square, Manchester.
- 1851 MOUAT, FREDERIC JOHN, M.D., late Surgeon-Major, Bengal Army; late Inspector-General of Gaols in the Lower Provinces of the Bengal Presidency, and Member of the Senate of the University of Calcutta.
- 1868 MOXON, WALTER, M.D., F.L.S., Assistant-Physician to, and Lecturer on Morbid Anatomy at, Guy's Hospital; 6, Finsbury circus.
- 1856 MURCHISON, CHARLES, M.D., LL.D. Edinb., F.R.S., Physician to, and Lecturer on Medicine at, St. Thomas's Hospital, Consulting Physician to the London Fever Hospital; 79, Wimpole street, Cavendish square. C. 1870-71. *Trans.* 3.
- 1863 MYERS, ARTHUR B. R., Coldstream Guards' Hospital, Vincent square, Westminster; Windsor.
- 1859 NAYLER, GEORGE, Surgeon to the Hospital for Diseases of the Skin, Blackfriars; 3, Savile row, Burlington gardens.
- 1870 NEILD, JAMES EDWARD, M.D., Lecturer on Forensic Medicine in the University of Melbourne; 166, Collins street east, Melbourne, Victoria.
- 1835 †NELSON, THOMAS ANDREW, M.D., 10, Nottingham terrace, York gate, Regent's park.
- 1843 NEWTON, EDWARD, 4, Upper Wimpole street. C. 1863-4.
- 1868 NICHOLLS, JAMES, M.D., Duke street, Chelmsford, Essex.
- 1849 NORMAN, HENRY BURFORD, Portland Lodge, Southsea, Hants.
- 1847 *NOURSE, WILLIAM EDWARD CHARLES, Surgeon to the Brighton Children's Hospital; Surgeon to St. Mary's Hospital, Brighton; 11, Marlborough place, Brighton.
- 1849 NOVERRE, ARTHUR, 16, Park street, Grosvenor square. C. 1870-71.

Elected

- 1864 NUNN, THOMAS WILLIAM, Surgeon to, and Lecturer on Surgery at, the Middlesex Hospital; 8, Stratford place, Oxford street.
- 1870 NUNNELEY, FREDERICK BARHAM, M.D., Assistant-Physician to, and Lecturer on Histology at, St. Mary's Hospital; Assistant-Physician to the Hospital for Sick Children; 28, Harley street, Cavendish square. *Trans.* 2.
- 1847 O'CONNOR, THOMAS, March, Cambridgeshire.
- 1843 O'CONNOR, WILLIAM, M.D., Senior Physician to the Royal Free Hospital; 30, Upper Montagu street, Montagu square.
- 1858 OGLE, JOHN WILLIAM, M.D., Physician to, and Lecturer on Pathology at, St. George's Hospital; 30, Cavendish square. *Trans.* 4.
- 1855 *OGLE, WILLIAM, M.A., M.D., Physician to the Derby Infirmary; 3, Stewart terrace, Derby.
- 1860 OGLE, WILLIAM, M.D., Assistant-Physician to, and Lecturer on Physiology at, St. George's Hospital; 34, Clarges street, Piccadilly. S. 1868-70. *Trans.* 3.
- 1870 OLDHAM, CHARLES FREDERIC, India [Grindlay and Co., Army Agents.]
- 1850 OLDHAM, HENRY, M.D., Consulting Obstetric Physician to Guy's Hospital; 4, Cavendish place, Cavendish square. C. 1865. *Trans.* 1.
- 1846 *ORMEROD, EDWARD LATHAM, M.D., Physician to the Sussex County Hospital; 14, Old Steine, Brighton *Trans.* 2.
- 1847 *PAGE, WILLIAM BOUSFIELD, Surgeon to the Cumberland Infirmary; Carlisle. *Trans.* 2.
- 1840 †PAGE, SIR JAMES, Bart., D.C.L., F.R.S., Sergeant-Surgeon Extraordinary to H.M. the Queen; Surgeon-in-Ordinary to H.R.H. the Prince of Wales; Consulting Surgeon to St. Bartholomew's Hospital; Surgeon to Christ's Hospital; Member of the Senate of the University of London; 1, Harewood place, Hanover square. C. 1848-49. V.P. 1861. T. 1867. *Trans.* 9. *Sci. Com.*

Elected

- 1858 *PALEY, WILLIAM, M.D., Physician to the Ripon Dispensary; Ripon, Yorkshire.
- 1836 PARKER, LANGSTON, Hon. Surgeon to the Queen's Hospital, Birmingham; 20, Colmore row, Birmingham.
- 1847 PARKER, NICHOLAS, M.D., Paris.
- 1841 PARKIN, JOHN, M.D., Rome.
- 1851 PART, JAMES, M.D., 89, Camden road, Camden town.
- 1828 †PARTRIDGE, RICHARD, F.R.S., Professor of Anatomy to the Royal Academy of Arts; Consulting Surgeon to King's College Hospital, and Professor of Anatomy in King's College, London; 17, New street, Spring gardens. S. 1832-6. C. 1837-8, 1861-2. V.P. 1847-8. P. 1863-4.
- 1865 PAVY, FREDERICK WILLIAM, M.D., F.R.S., Physician to, and Lecturer on Physiology at, Guy's Hospital; 35, Grosvenor street.
- 1869 PAYNE, JOSEPH FRANK, M.B., Assistant-Physician to St. Thomas's Hospital; 50, Green street, Park lane.
- 1845 PEACOCK, THOMAS BEVILL, M.D., Physician to, and Lecturer on Medicine at, St. Thomas's Hospital; Physician to the City of London Hospital for Diseases of the Chest, Victoria park; 20, Finsbury circus. S. 1855-6. V.P. 1867. C. 1869. *Trans.* 2.
- 1864 PEARSON, DAVID RITCHIE, M.D., 23, Upper Phillimore place, Kensington.
- 1856 PEIRCE, RICHARD KING, 16, Norland place, Notting hill.
- 1830 PELECHIN, CHARLES P., M.D., St. Petersburg.
- 1855 *PEMBERTON, OLIVER, Surgeon to the Birmingham General Hospital, and Professor of Surgery at the Queen's College, Birmingham; 18, Temple row, Birmingham. *Trans.* 1.
- 1870 PERRIN, J. BESWICK, Demonstrator of Anatomy at King's College, London; 16, Portugal street, Lincoln's Inn.
- 1852 PHILLIPS, RICHARD, 27, Leinster square, Westbourne grove.
- 1846 PHILP, FRANCIS RICHARD, M.D., Colby House, Kensington.

Elected

- 1867 PICK, THOMAS PICKERING, Assistant-Surgeon to, and Lecturer on Surgery at, St. George's Hospital; 7, South Eaton place, Eaton square. *Sci. Com.*
- 1851 *PICKFORD, JAMES HOLLINS, M.D., M.R.I.A., 1, Cavendish place, Brighton.
- 1841 PITMAN, HENRY ALFRED, M.D., *Vice-President*, Consulting Physician to St. George's Hospital, and to the Royal General Dispensary, St. Pancras; 28, Gordon square. L. 1851-3. C. 1861-2. T. 1863-8. V.P. 1870-1.
- 1850 POLAND, ALFRED, Surgeon to, and Lecturer on Ophthalmic Surgery at, Guy's Hospital; 42, Finsbury Circus. C. 1865-6. *Trans.* 2.
- 1871 POLLOCK, ARTHUR JULIUS, M.D., Physician to Charing Cross Hospital; Physician to the Foundling Hospital; 85, Harley street, Cavendish square.
- 1845 POLLOCK, GEORGE DAVID, *Vice-President*, Surgeon in Ordinary to H.R.H. the Prince of Wales; Surgeon to St. George's Hospital; 36, Grosvenor street. C. 1856-7. L. 1859-62. V.P. 1870-1. *Trans.* 3.
- 1865 POLLOCK, JAMES EDWARD, M.D., Physician to the Hospital for Consumption, Brompton; 52, Upper Brook street, Grosvenor square.
- 1843 POPE, CHARLES, M.D., Glastonbury, Somersetshire.
- 1846 POTTER, JEPHSON, M.D., F.L.S., Physician to the Liverpool General Hospital for Consumption and Diseases of the Chest; 6, Soho street, Liverpool.
- 1842 POWELL, JAMES, M.D.
- 1867 POWELL, RICHARD DOUGLAS, M.D., Assistant-Physician to, and Lecturer on Materia Medica at, Charing Cross Hospital, Assistant-Physician to the Hospital for Consumption, Brompton; 15, Henrietta street, Cavendish square.
- 1867 POWER, HENRY, Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. Bartholomew's Hospital; Examiner in Physiology at the University of London; 45, Seymour street, Portman square. *Sci. Com.*
- 1851 POWER, ROBERT FRANCIS, M.D., 71, Gloucester place, Portman square.

Elected

- 1857 PRIESTLEY, WILLIAM OVEREND, M.D., Physician-Accoucheur to H.R.H. the Princess Louis of Hesse; Professor of Midwifery in King's College, London, and Physician for the Diseases of Women and Children to King's College Hospital; Consulting Physician-Accoucheur to the St. Marylebone Infirmary; 17, Hertford street, May fair. *Sci. Com.*
- 1869 PULLAR, ALFRED, M.D.; 6, Spencer road, New Wandsworth.
- 1850 QUAIN, RICHARD, M.D., F.R.S., Physician to the Hospital for Consumption and Diseases of the Chest; Member of the Senate of the University of London; 67, Harley street, Cavendish square. C. 1866-7. *Trans. 1. Sci. Com.*
- 1835 †QUAIN, RICHARD, F.R.S., Surgeon Extraordinary to H.M. the Queen; Emeritus Professor of Clinical Surgery, University College, London, and Consulting Surgeon to the Eye Infirmary attached to the Hospital; 32, Cavendish square. C. 1838-9. L. 1846-8. T. 1851-3. V.P. 1856-7. *Trans. 1. Pro. 2.*
- 1852 RADCLIFFE, CHARLES BLAND, M.D., Physician to the Westminster Hospital; Physician to the National Hospital for the Paralysed and Epileptic; 25, Cavendish square. C. 1867-8.
- 1871 RALFE, CHARLES HENRY, M.A., 26, Queen Anne street, Cavendish square.
- 1857 RANKE, HENRY, M.D., Munich.
- 1854 RANSOM, WILLIAM HENRY, M.D., F.R.S., Physician to the Nottingham General Hospital; the Pavement, Nottingham.
- 1869 READ, THOMAS LAURENCE, 11, Petersham terrace, Queen's gate, Kensington.
- 1858 REED, FREDERICK GEORGE, M.D., 46, Hertford street, May fair. *Trans. 1.*
- 1821 REEDER, HENRY, M.D., Varick, Seneca County, New York, United States.
- 1857 REES, GEORGE OWEN, M.D., F.R.S., Physician to, and Lecturer on Medicine at, Guy's Hospital; 26, Albemarle street, Piccadilly. *Trans. 1.*

Elected

- 1868 REEVE, JOHN FOSTER, M.D., 46, Great Marlborough street.
- 1869 REEVES, WILLIAM, 5, the Crescent, Carlisle.
- 1855 REYNOLDS, JOHN RUSSELL, M.D., F.R.S., Professor of the Principles and Practice of Medicine in University College, London, and Physician to University College Hospital; Examiner in Medicine at the University of London; 38, Grosvenor street. C. 1870.
- 1865 RHODES, GEORGE WINTER, Surgeon to the Huddersfield Infirmary; Queen street south, Huddersfield.
- 1847 RICHARDS, SAMUEL, M.D., 36, Bedford square.
- 1852 RICHARDSON, CHRISTOPHER THOMAS, M.B., Warcop, Penrith.
- 1849 *RICHARDSON, WILLIAM, M.D., 25, Gloucester gardens, Bishop's road, Hyde park.
- 1869 RICKARDS, WALTER, M.D., Physician to the Royal Free Hospital; 8, Cavendish place, Cavendish square.
- 1845 RIDGE, BENJAMIN, M.D., 21, Bruton street, Berkeley square.
- 1843 RIDGE, JOSEPH, M.D., 39, Dorset square. C. 1858. *Pro. 1.*
- 1863 RINGER, SYDNEY, M.D., Professor of Materia Medica in University College, London, and Physician to University College Hospital; 15, Cavendish place, Cavendish square.
- 1871 RIVINGTON, WALTER, M.S., Surgeon to, and Lecturer on Anatomy at, the London Hospital; 22, Finsbury square.
- 1871 *ROBERTS, DAVID LLOYD, M.D., Surgeon to St. Mary's Hospital, Manchester; 23, St. John street, Deansgate, Manchester.
- 1852 ROBERTS, JOHN, M.R.C.P., the Park, Westow Hill, Upper Norwood.
- 1857 ROBERTSON, JOHN CHARLES GEORGE, Medical Superintendent of the Cavan District Lunatic Asylum; Monaghan, Ireland.
- 1862 ROBINSON, CHARLES, F.R.C.P. Edinb., 11, Montagu street, Portman square.

Elected

- 1843 ROBINSON, GEORGE, M.D. *Trans.* 2.
- 1843 RODEN, WILLIAM, M.D., the Grange, Kidderminster, Worcestershire.
- ♦ 1835 †ROE, GEORGE HAMILTON, M.D., Consulting Physician to the Hospital for Consumption and Diseases of the Chest; 13, Great Cumberland place, Hyde park. C. 1841-2. *Trans.* 1.
- 1829 ROOTS, WILLIAM SUDLOW, F.L.S., Surgeon to the Royal Establishment at Hampton Court; Kingston, Surrey.
- 1850 ROPER, GEORGE, Bank House, Aylsham, Norfolk.
- 1855 ROSCOW, THOMAS TATTERSALL, M.D., 52, Rue de Commerce, Brussels.
- 1836 *ROSE, CALEB BURRELL, F.G.S., 25, King street, Great Yarmouth, Norfolk. *Trans.* 1.
- 1857 ROSE, HENRY COOPER, M.D., F.L.S., Surgeon to the Hampstead Dispensary; High street, Hampstead. *Trans.* 1.
- 1849 ROUTH, CHARLES HENRY FELIX, M.D., Physician to the Samaritan Free Hospital for Women and Children; 52, Montagu square. *Trans.* 1.
- 1863 ROWE, THOMAS SMITH, M.D., Surgeon to the Royal Seabathing Infirmary; Cecil street, Margate, Kent.
- 1834 RUMSEY, HENRY WYLDBORE, Priory House, Cheltenham.
- 1845 RUSSELL, JAMES, M.D., Physician to the Birmingham General Hospital, and Professor of Medicine at Queen's College, Birmingham; 91, New Hall street, Birmingham.
- 1871 RUTHERFORD, WILLIAM, M.D., Professor of Physiology at King's College, London; 12, Upper Berkeley street, Portman square.
- 1856 SALTER, S. JAMES A., F.R.S., F.L.S., Dental Surgeon to, and Lecturer on Dental Surgery at, Guy's Hospital; 17, New Broad street, City. C. 1871. *Trans.* 2.
- 1849 SANDEBSON, HUGH JAMES, MD., 26, Upper Berkeley street, Portman square.

Elected

- 1855 SANDEBSON, JOHN BURDON, M.D., F.R.S., Professor of Practical Physiology at University College; 49, Queen Anne street, Cavendish square. C. 1869-70. *Trans.* 1. *Sci. Com.* 2.
- 1867 SANDFORD, FOLLIOTT JAMES, M.D., Market Drayton, Shropshire.
- 1847 SANKEY, WILLIAM HENRY OCTAVIUS, M.D., Lecturer on Mental Diseases at University College, London; Sandywell park, Cheltenham.
- 1869 SANSOM, ARTHUR ERNEST, M.D., Physician to the Royal Hospital for Diseases of the Chest, City road; 29, Duncan terrace, Islington. *Trans.* 1.
- 1845 SAUNDERS, EDWIN, Surgeon-Dentist to H.M. the Queen, and to H.R.H. the Prince of Wales; 13A, George street, Hanover square.
- 1834 SAUVAN, LUDWIG V., M.D., Warsaw.
- 1859 SAVORY, WILLIAM SCOVELL, F.R.S., Surgeon to, and Lecturer on Surgery at, St. Bartholomew's Hospital; 66, Brook street, Grosvenor square. C. 1871. *Trans.* 3. *Sci. Com.* 3.
- 1853 SCHULHOF, MAURICE, M.D., 46, Brook street, Grosvenor square.
- 1861 *SCOTT, WILLIAM, M.D., Physician to the Huddersfield Infirmary; Waverley House, Huddersfield.
- 1863 SEDGWICK, WILLIAM, Surgeon to the St. Marylebone Provident Dispensary; 12, Park place, Upper Baker street. *Trans.* 2.
- 1856 SERCOMBE, EDWIN, 41, Brook street, Grosvenor square. *Trans.* 1. *Pro.* 1.
- 1840 SHARP, WILLIAM, M.D., F.R.S., Horton House, Rugby. *Trans.* 1.
- 1837 †SHARPEY, WILLIAM, M.D., F.R.S., LL.D., Professor of Anatomy and Physiology in University College, London; Member of the Senate of the University of London; Secretary of the Royal Society; University College, and Lawnbank, Hampstead. C. 1848-9. V.P. 1862.

Elected

- 1836 †SHAW, ALEXANDER, Consulting Surgeon to the Middlesex Hospital; 40, Abbey road west, Kilburn. C. 1842. S. 1843-4. V.P. 1851-2. T. 1858-60. *Trans.* 4.
- 1848 *SHEARMAN, EDWARD JAMES, M.D., F.R.S. Edin., F.L.S., Consulting Physician to the Rotherham Dispensary; Moorgate, Rotherham, Yorkshire.
- 1859 SIBLEY, SEPTIMUS WILLIAM, 12, New Burlington street. *Trans.* 4. *Sci. Com.*
- 1849 SIBSON, FRANCIS, M.D., F.R.S., Consulting Physician to St. Mary's Hospital; Member of the Senate of the University of London; 59, Brook street, Grosvenor square. C. 1863-4. *Trans.* 1. *Sci. Com.*
- 1848 SIEVEKING, EDWARD HENRY, M.D., Physician in Ordinary to H.R.H. the Prince of Wales; Physician to St. Mary's Hospital; 17, Manchester square. C. 1859-60. S. 1861-3. *Trans.* 2. *Sci. Com.*
- 1842 SIMON, JOHN, D.C.L., F.R.S., Surgeon to St. Thomas's Hospital; Medical Officer of the Privy Council; 8, Richmond terrace, Whitehall, and 40, Kensington square. C. 1854-5. V.P. 1865. *Trans.* 1.
- 1865 SIMS, J. MARION, M.D., 47, Faubourg St. Honoré, Paris.
- 1857 SIORDET, JAMES LEWIS, M.B., Villa Preti, Mentone, Nice.
- 1824 †SKEY, FREDERIC CARPENTER, C.B., F.R.S., Consulting Surgeon to, and Lecturer on Clinical Surgery at, St. Bartholomew's Hospital; 24, Mount street, Grosvenor square. C. 1828. L. 1829-31. V.P. 1841-2. P. 1859-60. *Trans.* 1.
- 1852 SMITH, CHARLES CASE, Consulting Surgeon to the Suffolk General Hospital.
- 1866 SMITH, HEYWOOD, M.A. M.B. Oxon., Physician to the Hospital for Women; Physician to the British Lying-in Hospital; 2, Portugal street, Grosvenor square.
- 1835 SMITH, JOHN GREGORY, Medical Superintendent, Atkinson-Morley Convalescent Hospital, Corpse Hill, Wimbledon, Surrey.

Elected

- 1843 SMITH, ROBERT WILLIAM, M.D., M.R.I.A., Professor of Surgery in the University of Dublin; Surgeon to the Richmond Hospital; Surgeon to Sir Patrick Dun's Hospital; 67, Eccles street, Dublin.
- 1838 †SMITH, SPENCE, Surgeon to, and Lecturer on Clinical Surgery at, St. Mary's Hospital; 9, Queen Anne street, Cavendish square. C. 1854. S. 1855-8. V.P. 1859-60. T. 1865.
- 1863 SMITH, THOMAS, *Secretary*; Assistant-Surgeon to, and Lecturer on Anatomy at, St. Bartholomew's Hospital; Surgeon to the Hospital for Sick Children; 5, Stratford place, Oxford street. S. 1870-1. *Trans.* 3. *Sci. Com.*
- 1864 *SMITH, THOMAS HECKSTALL, Rowlands, St. Mary Cray, Kent.
- 1845 SMITH, WILLIAM, 70, Pembroke road, Clifton, Bristol. *Trans.* 1.
- 1847 SMITH, WILLIAM J., M.D., Consulting Physician to the Weymouth Infirmary; Greenhill, Weymouth, Dorsetshire.
- 1850 SMITH, WILLIAM TYLER, M.D., Consulting Physician-Accoucheur to St. Mary's Hospital; 21, Upper Grosvenor street, W. C. 1867-8. *Trans.* 2.
- 1868 SOLLY, SAMUEL EDWIN, 6, Savile row, Burlington gardens.
- 1865 SOUTHAM, GEORGE, Surgeon to the Manchester Royal Infirmary, and Lecturer on Surgery at the Manchester Royal School of Medicine; 10, Lever street, and Oakfield, Pendleton, Manchester. *Trans.* 4.
- 1865 SOUTHEY, REGINALD, M.D., Physician to, and Lecturer on Forensic Medicine at, St. Bartholomew's Hospital; 6, Harley street, Cavendish square.
- 1844 SPACKMAN, FREDERICK R., M.D., Harpenden, St. Albans.
- 1834 SPARK, JAMES, Italy.
- 1851 SPITTA, ROBERT JOHN, M.B., Medical Officer to the Clapham General Dispensary; Clapham Common, Surrey* *Trans.* 1.

Elected

- 1843 *SPRANGER, STEPHEN, Hursley, Hampshire.
- 1867 SQUAREY, CHARLES EDWARD, M.B., Assistant-Physician to the Hospital for Women; 13, Upper Wimpole street. *Trans.* 2.
- 1851 STARTIN, JAMES, Senior Surgeon to the Hospital for Diseases of the Skin, Blackfriars; 3, Savile row, Burlington gardens.
- 1854 STEVENS, HENRY, M.D., Medical Department, Privy Council Office, 8, Richmond terrace, Whitehall.
- 1842 STEWART, ALEXANDER PATRICK, M.D., *Vice-President*; Consulting Physician to the Middlesex Hospital; 75, Grosvenor street. C. 1856-7. L. 1863-8. V.P. 1871.
- 1859 STEWART, WILLIAM EDWARD, 12, Weymouth street, Portland place.
- 1856 STOCKER, ALONZO HENRY, M.D., Resident Medical Superintendent of Grove Hall Lunatic Asylum, Bow.
- 1865 STOKES, WILLIAM, JUN., M.D., Lecturer on Surgery at the Carmichael School of Medicine, and Surgeon to the Richmond Surgical Hospital; 3, Clare street, Merriion square, Dublin. *Trans.* 1.
- 1843 STORKS, ROBERT REEVE, Paris.
- 1858 †STREATFEILD, JOHN FREMLYN, Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 15, Upper Brook street, Grosvenor square.
- 1871 STRONG, HENRY JOHN, M.D., 64, North End, Croydon.
- 1863 STURGES, OCTAVIUS, M.D., Assistant-Physician to, and Lecturer on Materia Medica at, the Westminster Hospital; 85, Wimpole street, Cavendish square.
- 1869 SUTRO, SIGISMUND, M.D., Senior Physician to the German Hospital; 37A, Finsbury square.
- 1871 SUTTON, HENRY GAWEN, M.B., Assistant-Physician to, and Lecturer on Pathology at, the London Hospital, and Physician to the City of London Hospital for Diseases of the Chest; 9, Finsbury square.

Elected

- 1855 SUTTON, JOHN MAULE, M.D., St. Clairs, Dartmouth, Devon.
- 1861 *SWEETING, GEORGE BACON, King's Lynn, Norfolk.
- 1854 *SYMONDS, FREDERICK, Surgeon to the Radcliffe Infirmary, and Consulting Surgeon to the Oxford Dispensary ; 35, Beaumont street, Oxford.
- 1870 TAIT, ROBERT LAWSON, 7, Waterloo street, Birmingham.
- 1844 TAMPLIN, RICHARD WILLIAM, Surgeon to the Royal Orthopædic Hospital ; 33, Old Burlington street.
- 1864 TAUSSIG, GABRIEL, M.D., 70, Piazza Barberini, Rome.
- 1852 TAYLOR, ROBERT, Surgeon to the Central London Ophthalmic Hospital, and to the Cripples' Home, Marylebone road ; 7, Lower Seymour street, Portman square.
- 1845 TAYLOR, THOMAS, Warwick House, Warwick place, Grove End road, St. John's wood.
- 1859 TEGART, EDWARD, 49, Jermyn street, St. James's.
- 1862 THOMPSON, EDMUND SYMES, M.D., *Secretary* ; Physician to the Hospital for Consumption, Brompton ; Gresham Professor of Medicine ; 3, Upper George street, Portman square. S. 1871.
- 1857 THOMPSON, HENRY, M.D., Physician to the Middlesex Hospital ; 53, Queen Anne street, Cavendish square.
- 1852 THOMPSON, SIR HENRY, Surgeon Extraordinary to H.M. the King of the Belgians ; Professor of Clinical Surgery in University College, London, and Surgeon to University College Hospital ; 35, Wimpole street, Cavendish square. C. 1869. *Trans.* 4.
- 1862 THOMPSON, REGINALD EDWARD, M.D., Assistant-Physician to the Hospital for Consumption, Brompton ; 21, South street, Park lane. *Trans.* 1 *Sci. Com.*
- 1836 THURNAM, JOHN, M.D., Resident Medical Superintendent of the Wilts County Asylum, Devizes, Wiltshire. *Trans.* 4.
- 1848 TILT, EDWARD JOHN, M.D., Consulting Physician to the Farringdon General Dispensary and Lying-in Charity ; 60, Grosvenor street,

Elected

- 1867 TONGE, MORRIS, M.D., Harrow-on-the-Hill, Middlesex.
- 1828 TORRIE, JAMES, M.D.
- 1867 TROTTER, JOHN WILLIAM, Assistant-Surgeon, Coldstream Guards; Hospital, Vincent square, Westminster.
- 1859 TRUMAN, EDWIN THOMAS, Surgeon-Dentist in Ordinary to Her Majesty's Household; 23, Old Burlington street.
- 1864 TUFNELL, THOMAS JOLLIFFE, Examiner in Surgery to the Royal College of Surgeons of Ireland; 58, Lower Mount street, Merrion square, Dublin.
- 1862 TUKE, THOMAS HARRINGTON, M.D., Manor House, Chiswick, and 37, Albemarle street, Piccadilly.
- 1855 TULLOCH, JAMES STEWART, M.D., 1, Pembridge place, Bayswater.
- 1845 TURNER, THOMAS, F.L.S., Consulting Surgeon to the Manchester Royal Infirmary; 77, Mosley street, Manchester.
- 1806 VAUX, BOWYER, Teignmouth, Devon.
- 1870 VENNING, EDGCOMBE, Assistant Surgeon, 1st Life Guards; Knightsbridge Barracks, and 24, Belgrave square.
- 1865 VERNON, BOWATER JOHN, Ophthalmic Surgeon to St. Bartholomew's Hospital, and Curator Royal London Ophthalmic Hospital; Ophthalmic Surgeon to the West London Hospital; 44A, Wimpole street, Cavendish square.
- 1867 VINTRAS, ACHILLE, M.D., Physician to the French Hospital, Lisle street, Leicester square; 141, Regent street.
- 1828 VULPES, BENEDETTO, M.D., Physician to the Hospital of Aversa, and the Hospital of Incurables, Naples.
- 1854 WADDINGTON, EDWARD.
- 1841 WADE, ROBERT, Senior Surgeon to the Westminster General Dispensary; 68, Dean street, Soho. *Trans.* 1.
- 1870 WADHAM, WILLIAM, M.D., Physician to, and Lecturer on Medical Jurisprudence at, St. George's Hospital; 12, Park lane, Hyde park.

Elected

- 1864 WAITE, CHARLES DERBY, M.B., Senior Physician to the Westminster General Dispensary; 3, Old Burlington street.
- 1868 *WALKER, ROBERT, L.R.C.P. Ed., Surgeon to the Carlisle Dispensary; 25, Lowther street, Carlisle.
- 1867 *WALLIS, GEORGE, Benet street, Cambridge.
- 1861 *WALSH, JAMES, M.D., Staff-Surgeon, R.N., 41, Cathrine street, Limerick, Ireland.
- 1852 WALSHE, WALTER HAYLE, M.D., Emeritus Professor of the Principles and Practice of Medicine, University College, London; Consulting Physician to the Hospital for Consumption; 37, Queen Anne street, Cavendish square. *Trans.* 1.
- 1851 WALTON, HENRY HAYNES, Surgeon to St. Mary's Hospital and to the Ophthalmic Department; 1, Brook street, Hanover square. *Trans.* 1. *Pro.* 1.
- 1852 WANE, DANIEL, M.D., 20, Grafton street, Berkeley square.
- 1821 WARD, WILLIAM TILLEARD.
- 1858 WARDELL, JOHN RICHARD, M.D., 4, Belmont, Tunbridge Wells.
- 1846 WARE, JAMES THOMAS, Surgeon to the Metropolitan Convalescent Institution; 18, Gordon square, and Tilford House, near Farnham, Surrey.
- 1818 WARE, JOHN, Clifton Down, near Bristol.
- 1814 †WARE, MARTIN, 18, Gordon square. C. 1844-5. T. 1846. V.P. 1853.
- 1866 WARING, EDWARD JOHN, M.D. [Agents: Messrs. Grindlay and Co., 55, Parliament street]; 49, Clifton gardens, Maida Vale.
- 1861 WATERS, A. T. HOUGHTON, M.D., Physician to the Liverpool Northern Hospital, and Lecturer on Anatomy and Physiology in the Liverpool Royal Infirmary School of Medicine; 27, Hope street, Liverpool. *Trans.* 3.
- 1837 †WATSON, SIR THOMAS, Bart., M.D., D.C.L., F.R.S., Physician in Ordinary to H.M. the Queen; Consulting Physician to King's College Hospital; 16, Henrietta street, Cavendish square. C. 1840-1, 1852. V.P. 1845-6.

Elected

- 1861 WATSON, WILLIAM SPENCER, M.B., Surgeon to the Great Northern Hospital; Surgeon to the Royal South London Ophthalmic and to the Central London Ophthalmic Hospitals; 7, Henrietta street, Cavendish square.
- 1854 WEBB, WILLIAM, M.D., Gilkin View House, Wirksworth, Derbyshire.
- 1840 WEBB, WILLIAM WOODHAM, M.D. (travelling).
- 1842 WEBER, FREDERIC, M.D., 44, Green street, Park lane. C. 1857. V.P. 1865.
- 1857 WEBER, HERMANN, M.D., Physician to the German Hospital; 10, Grosvenor street, Grosvenor square. *Trans.* 6.
- 1835 †WEBSTER, JOHN, M.D., F.R.S., Physician to the Scottish Hospital, and Consulting Physician to the St. George's and St. James's Dispensary; 9, Queen street, St. Andrew's. C. 1843-4. V.P. 1855-6. *Trans.* 6. *Pro.* 1.
- 1844 WEGG, WILLIAM, M.D., Physician to the St. George's Dispensary; 26, Park lane. L. 1854-8. C. 1861-2.
- 1861 WELLS, JOHN SOELBERG, Professor of Ophthalmology in King's College, London, and Ophthalmic Surgeon to King's College Hospital; Assistant-Surgeon to the Royal London Ophthalmic Hospital; 16, Savile row.
- 1854 WELLS, THOMAS SPENCER, Surgeon in Ordinary to H.M.'s Household; Surgeon to the Samaritan Free Hospital for Women and Children; 3, Upper Grosvenor street. C. 1870. *Trans.* 8. *Pro.* 1.
- 1842 †WEST, CHARLES, M.D., Physician to the Hospital for Sick Children; 61, Wimpole street, Cavendish square. C. 1855-6. V.P. 1863. *Trans.* 2. *Sci. Com.*
- 1828 WHATLEY, JOHN, M.D.
- 1849 WHITE, JOHN.
- 1852 WIBLIN, JOHN, M.D., Medical Inspector of Emigrants and Recruits; Southampton. *Trans.* 1.
- 1844 WILDBORE, FREDERIC, 245, Hackney road.
- 1870 *WILKIN, JOHN F., Roxby House, Folkestone.
- 1837 WILKS, GEORGE AUGUSTUS FREDERICK, M.D., Stanbury, Torquay. [5, Lincoln's Inn Fields].

Elected

- 1863 WILKS, SAMUEL, M.D., F.R.S., Physician to, and Lecturer on Medicine at, Guy's Hospital; 77, Grosvenor street, Grosvenor square.
- 1865 WILLETT, ALFRED, Assistant-Surgeon to, and Lecturer on Operative Surgery at, St. Bartholomew's Hospital; Surgeon to St. Luke's Hospital; 36, Wimpole street, Cavendish square.
- 1864 WILLETT, EDMUND SPARSHALL, M.D., Resident Physician, Wyke House, Isleworth, Middlesex.
- 1840 †WILLIAMS, CHARLES JAMES BLASIUS, M.D., F.R.S., Consulting Physician to the Hospital for Consumption, Brompton; 49, Upper Brook street, Grosvenor square. C. 1849-50. V.P. 1860-1. *Sci. Com.*
- 1859 *WILLIAMS, CHARLES, Assistant-Surgeon to the Norfolk and Norwich Hospital; 9, Prince of Wales road, Norwich.
- 1866 WILLIAMS, CHARLES THEODORE, M.D., Physician to the Hospital for Consumption, Brompton; 78, Park street, Grosvenor square. *Trans.* 1.
- 1859 WILLIAMS, JOSEPH, M.D. [3, Chichester street, Upper Westbourne terrace.]
- 1868 WILLIAMS, WILLIAM RHYS, M.D., Lecturer on Mental Diseases at St. Thomas's Hospital; Bethlehem Royal Hospital, Lambeth road.
- 1829 WILLIS, ROBERT, M.D., Barnes, Surrey. L. 1838-41.
- 1839 †WILSON, ERASMUS, F.R.S., Professor of Dermatology, Royal College of Surgeons of England; 17, Henrietta street, Cavendish square. *Trans.* 2.
- 1863 WILSON, ROBERT JAMES, F.R.C.P. Edin., 7, Warrior square, St. Leonard's-on-Sea, Sussex.
- 1850 *WISE, ROBERT STANTON, M.D., Consulting Physician to the Southam Eye and Ear Infirmary; Banbury, Oxfordshire.
- 1825 WISE, THOMAS ALEXANDER, M.D., Rostellan Castle, Rostellan, County Cork.
- 1841 WOOD, GEORGE LEIGHTON, 27, Queen square, Bath.

Elected

- 1851 WOOD, JOHN, F.R.S., Surgeon to King's College Hospital, and Professor of Surgery in King's College, London ; Examiner in Anatomy at the University of London ; Examiner in Anatomy and Physiology at the University of Cambridge ; 68, Wimpole street. C. 1867-8. *Trans.* 3.
- 1848 WOOD, WILLIAM, M.D., Physician to St. Luke's Hospital for Lunatics ; 99, Harley street, Cavendish square. C. 1867-8.
- 1833 †WORMALD, THOMAS, Consulting Surgeon to St. Bartholomew's Hospital ; 42, Bedford row. C. 1839. V.P. 1854.
- 1842 WORTHINGTON, WILLIAM COLLINS, Senior Surgeon to the Lowestoft Infirmary ; Lowestoft, Suffolk. *Trans.* 3.
- 1865 WOTTON, HENRY, Jun.
- 1860 WYATT, JOHN, Surgeon-Major, Coldstream Guards ; Hospital, Vincent square, Westminster.
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[It is particularly requested that any change of Title, Appointment, or Residence, may be communicated to the Secretaries before the 1st of October in each year, in order that the List may be made as correct as possible.]

HONORARY FELLOWS.

(Limited to Twelve.)

Elected

- 1853 BRODIE, SIR BENJAMIN COLLINS, Bart., M.A., F.R.S.,
Waynflete Professor of Chemistry in the University of
Oxford; Cowley House, Oxford.
- 1847 CHADWICK, EDWIN, Corresponding Member of the Academy
of Moral and Political Sciences of the Institute of
France.
- 1868 DARWIN, CHARLES, M.A., F.R.S., Corresponding Member
of the Academies of Sciences of Berlin, Stockholm,
Dresden, &c.; Down, Bromley, Kent.
- 1857 FARR, WILLIAM, M.D., D.C.L., F.R.S., General Register
Office, Somerset House, and Southlands, Bickley,
Kent.
- 1868 HOOKER, JOSEPH DALTON, M.D., D.C.L., LL.D., Director
of the Royal Botanic Gardens, Kew; Corresponding
Member of the Academy of Sciences of the Institute
of France; Kew.
- 1868 HUXLEY, THOMAS HENRY, LL.D., Professor of Natural His-
tory in the Royal School of Mines; Corresponding
Member of the Academies of Sciences of St. Peters-
burgh, Berlin, Dresden, &c.; 26, Abbey place, St. John's
Wood.
- 1868 LYELL, SIR CHARLES, Bart., D.C.L., LL.D., Corresponding
Member of the Academies of Sciences of Paris, Berlin,
Philadelphia, Boston, &c.; 73, Harley street, Cavendish
square.
- 1847 OWEN, RICHARD, D.C.L., LL.D., F.R.S., Superintendent of
the Natural History Departments in the British
Museum; Foreign Associate of the Academy of
Sciences of the Institute of France; Sheen Lodge,
Mortlake.

Elected

- 1825 SEDGWICK, the Rev. ADAM, A.M., D.C.L., LL.D., F.R.S.,
Woodwardian Professor of Geology, Cambridge.
- 1868 TYNDALL, JOHN, LL.D., Professor of Natural Philosophy in
the Royal Institution; Corresponding Member of the
Academies and Societies of Sciences of Göttingen,
Haarlem, Geneva, &c.; Royal Institution, Albemarle
street, Piccadilly.

FOREIGN HONORARY FELLOWS.

(Limited to Twenty.)

Elected

- 1841 ANDRAL, G., M.D., Member of the Institute and of the Academy of Medicine ; Paris.
- 1862 CRUVEILHIER, JEAN, M.D., Physician to the "Hôpital de la Charité;" Member of the Academy of Medicine ; Paris.
- 1864 DONDEERS, FRANZ CORNELIUS, M.D., Professor of Physiology and Ophthalmology at the University of Utrecht.
- 1856 DUBOIS, BARON PAUL, Commander of the Legion of Honour ; Member of the Academy of Medicine ; Paris.
- 1835 EKSTRÖMER, CARL JOHAN, M.D., C.M., K.P.S., and W., Physician to the King of Sweden ; President of the College of Health, and Director-General of Hospitals ; Stockholm.
- 1841 EHRENBURG, CHRISTIAN GOTTFRIED, Foreign Associate of the Academy of Sciences of the Institute of France Berlin.
- 1868 GROSS, SAMUEL D., M.D., F.R.C.P. Philad., Professor of Surgery in the Jefferson Medical College of Philadelphia.
- 1866 HANNOVER, ADOLPH, M.D., Professor at Copenhagen.
- 1859 HENLE, J., M.D., Professor of Anatomy at Göttingen.
- 1868 KÖLLIKER, ALBERT, Professor of Anatomy at Würzburg.
- 1856 LANGENBECK, BERNHARD, M.D., Professor of Surgery in the University of Berlin.
- 1868 LARREY, HIPPOLYTE BARON, Member of the Institute ; Inspector of the "Service de Santé Militaire," and Member of the "Conseil de Santé des Armées;" Commander of the Legion of Honour, &c. ; Rue de Lille, 91, Paris.
- 1843 LIEBIG, BARON JUSTUS von, M.D., Conservator of the Royal Collection, and Professor of Chemistry, in the University of Munich ; Foreign Associate of the Academy of Sciences of the Institute of France ; Munich.

Elected

- 1841 LOUIS, P. C. A., M.D., Honorary Physician to the Hotel-Dieu ; Member of the Academy of Medicine ; Paris.
- 1868 NÉLATON, AUGUSTE, Member of the Institute, and of the Academy of Medicine ; 1, Avenue d'Antin, Paris.
- 1862 PIROGOFF, NIKOLAUS, M.D., Professor of Surgery to the Medico-Chirurgical Academy in St. Petersburg, and Director of the Anatomical Institute ; Consulting Physician to the Hospitals Obuchow, Peter-Paul, and Maria Magdalena ; St. Petersburg.
- 1850 ROKITANSKY, CARL, M.D., Curator of the Imperial Pathological Museum, and Professor of the University of Vienna. Referee for Medical and University Education to the Austrian Ministry ; Vienna.
- 1856 STROMEYER, LOUIS, M.D., Director-General of the Medical Department of the Army of Hanover ; Hanover.
- 1856 VIRCHOW, RUDOLPH, M.D., Professor of Pathological Anatomy in the University of Berlin ; Corresponding Member of the Academy of Sciences of the Institute of France ; Berlin.

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ON THE
ELECTROLYTIC TREATMENT
OF
HYDATID TUMOURS OF THE LIVER,
WITH AN ADDENDUM ON
SIMPLE ACUPUNCTURE.

BY
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AND
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HOSPITAL.

Received May 24th.—Read Nov. 8th, 1870.

IN his work 'On the Electrolytic Treatment of Tumours and other Surgical Diseases'¹ Dr. Althaus mentions hydatid tumours of the liver among the affections to which he conceives this method of cure to be applicable. It does not appear, however, that he has made trial of the operation in any case of hydatid disease in the human subject. The only example to which he refers is one in which he electrolysed an hydatid tumour situated among the muscles of the hip of a horse. In this instance the operation was followed by

¹ London, 1867.

shrinking of the tumour ; but, perhaps, it is not very clear that this result was due to the treatment, because before it was commenced the cyst had been getting smaller in consequence of suppuration already established within it.

We therefore believe that we were the first to carry out Dr. Althaus' suggestion, when, on July 31st, 1867, we performed the operation of electrolysis on a child affected with a large hydatid tumour of the liver. The result in this instance was so satisfactory that we have adopted the same treatment in all cases of uncomplicated hydatid disease of the liver that have since come under our care. These cases are six in number, including one which was under the care of Dr. Wilks and one of ourselves. By the courtesy of our colleagues we are able to add two others, one of which was under the care of Dr. Rees, the other under the care of Dr. Phillips. In each of these the same operation was performed by Mr. Cooper Forster. The issue of every one of the eight cases has been very satisfactory. In one only does any doubt remain as to the completeness of the cure, and in this no ill effects whatever followed the operation. We therefore think ourselves justified in bringing this method of treatment under the notice of the Fellows of the Royal Medical and Chirurgical Society, and the more so inasmuch as a similar procedure has not, so far as we know, been employed by any one else.

CASE 1.—Large hydatid cyst, reaching both surfaces of the liver ; electrolysis ; cure.

(The following report is from the notes taken by the Clinical Clerk,
Mr. BRANFORD EDWARDS.)

Susan B—, æt. 7, admitted into the clinical ward under the care of Dr. Fagge, July 24th, 1867.

About three months ago her mother first noticed a tumour in the child's abdomen ; she thinks it was then of about the same size as at present. The child has never complained of any pain and has not suffered in any way, but has been growing thinner lately, and has at times been very yellow.

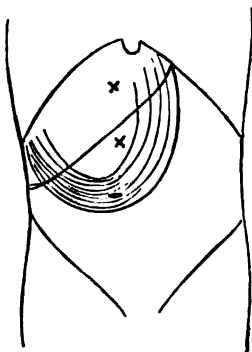
About a year ago she injured her abdomen by falling over a form at school.

Her diet has consisted almost exclusively of bread and butter; it is only very rarely that she has had any meat. She has often had watercresses and other green vegetables.

On admission the child appears in tolerably good health. She is not much emaciated. In the abdomen there is a large tumour, more or less spherical in shape, projecting downwards from the liver. The cartilages of the right ribs are distinctly thrown outwards, but the hepatic dulness does not extend higher than natural. The tumour can be felt to extend about an inch below the umbilicus.

The accompanying diagram (fig. 1) shows the situation

FIG. 1.



and form of the tumour. It can be felt to be crossed by an oblique ridge, the direction of which is downwards and to the right. This ridge appears to be part of the edge of the liver, being distinctly traceable into this edge in the right lumbar region. The most prominent part of the tumour is just above this ridge, a little to the right of the umbilicus.

The tumour therefore appears to occupy the whole thickness of the liver, and to project from both the upper and the lower surfaces of the organ. Its surface is smooth and even. It fluctuates distinctly, and feels like a tense cyst. It appears to be of about the size of a cocoa-nut.

The child was ordered to take some mist. quin. for a few days.

On July 31st the operation of electrolysis was performed by Mr. Durham, the child being placed under chloroform. The needles were introduced at the points indicated by asterisks in the diagram; one above the ridge which crossed the tumour, the other below this ridge. They evidently passed into a large cavity, and could be freely rubbed against one another. The current was allowed to pass for twenty minutes. When the lower needle was withdrawn a drop of clear fluid escaped. Slight redness showed itself beneath the sponge (in connection with the positive pole of the battery); this was taken as a proof that the current had passed.

About an hour after the operation the child had what appeared to be a severe paroxysm of pain, but this soon passed off. Three hours after the operation the pulse was 108.

Unfortunately, the notes of the further progress of the case during the patient's residence in the hospital have been mislaid. Speaking from memory, however, we can say that she quickly recovered from the operation. She was discharged on August 12th.

On October 9th the child was brought back to the hospital, and was readmitted into the clinical ward under Dr. Rees' care. The tumour was still plainly to be felt, and it was by no means obvious that any good had been done by the operation. In Dr. Fagge's opinion, however, it was smaller than before, and at his request the child was discharged on October 19th, in order that a longer interval might elapse, and that the effect of the operation performed in the summer might be more fully tested. The child's mother was directed to bring her up again to the hospital in a few months. This, however, she neglected to do, and as she had moved to the extreme east of London there was a difficulty in tracing her. In the summer of 1868 Mr. Richard Rendle, the present Surgical Registrar of Guy's Hospital, sought her out. His examination showed that no tumour was any longer discoverable in the abdomen.

CASE 2.—*Hydatid tumour growing from the convex surface of the liver, and pushing the diaphragm upwards; electrolysis; effusion of fluid into the right pleura; cure complete within five or six months, with restoration of the symmetry of the chest.*

(The following report was taken by Mr. RICHARD REEDLE, Clinical Clerk.)

William P—, æt. 17, admitted into the clinical ward, Guy's Hospital, under the care of Dr. Hilton Fagge, June 4th, 1868.

He has always enjoyed good health until six months since, when he began to work as a "lumper" on the river, unloading barges, and often having to carry heavy weights. He had previously been a printer.

About the time named he began to suffer from pain in the right side, so severe as to prevent him working and to keep him at home for nine days. The pain, he says, was like that of cramp, and was accompanied by pain in the right shoulder. He came to the hospital as an out-patient, and was told that it was pleurisy. After a time the pain ceased, and he returned to his work. He continued, however, to be troubled with slight pain in the side, and four months ago he noticed a swelling in that region.

He is a tall well-nourished youth.

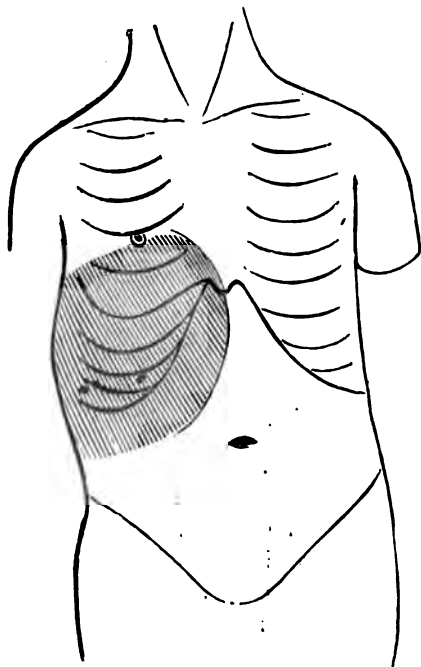
There is a uniform bulging of the lower part of the chest on the right side, throwing the ribs outwards (vide diagram, fig. 2). On measurement, an inch below the level of the ensiform cartilage, the right side measures $17\frac{1}{4}$ inches, the left 17 inches. There is no observable difference in the mobility of the two sides. Percussion dulness begins at the level of the nipple, and is absolute on the fifth rib. The line of dulness, when traced backwards, is found gradually to descend, so that in the back there is no deficiency in the normal resonance (vide diagram, fig. 3).

On percussion over the right side of the abdomen it is found that there is dulness for seven inches vertically from the fifth rib downwards. The muscles over this region are more rigid than those of the opposite side, and there is some

tenderness on palpation near the costal cartilages. A hardness can be felt for three inches below the ribs on the right side. No fluctuation is discoverable. The edge of the liver cannot be made out.

The respiratory murmur is somewhat deficient on the right side of the chest, as compared with the left side.

FIG. 2.



It was thus evident that the patient had a tumour of considerable size on the right side of the chest and abdomen, causing the ribs to bulge outwards to a considerable extent. The physical signs were incompatible with those of pleuritic effusion. The age of the patient, and the fact that he was a fresh-coloured, well-nourished youth, being taken into consideration, it was inferred that the tumour was an hydatid, growing in the liver, and probably projecting chiefly from its convex surface. Mr. Durham was, therefore, requested to ex-

amine the case, and he concurred with Dr. Fagge as to the diagnosis. On June 16th a careful physical examination of the chest was made, and the precise area of dulness, &c., was determined as described in the report.

On June 18th, at 2.20 p.m., Mr. Durham performed the operation of electrolysis, in the manner described, in the

FIG. 8.



presence of Mr. Hilton and Dr. Fagge. Two needles were introduced; one between the eighth and ninth cartilages, $2\frac{1}{2}$ inches above the umbilicus and $6\frac{1}{2}$ inches from the median line; the other, on the same horizontal plane, between the ninth and tenth ribs, two inches further outwards. The first could be moved about very freely, as if in the cyst; the second was less freely movable. The two needles could be distinctly rubbed against one another. A wet sponge, connected with the positive pole, was placed on the surface of the skin, between and near the needles. The

current was then allowed to pass for twenty-five minutes. During this time the needles were moved rapidly to and fro by the action of the muscles, the contractions of which were very strong. After a time a little emphysema showed itself at the points of introduction of the needles. On their removal a pad of lint was laid over the part.

During the operation the patient complained of very little pain, except from the cramp of the muscles. After its termination there was some pain in the chest, which increased until 7 p.m., and then abated. At 9 p.m. he still complained of pain in the chest and at the points of introduction of the needles. His pulse was 104; temp. 100.9°. He was unable to micturate, apparently in consequence of being compelled to remain lying on his back. A catheter was therefore passed, and a pint of urine was drawn off. This gave him relief.

On the following day (the 19th) his pulse was 88; his temp. 99.6°. He had not slept well; he had still some pain in the right side, "probably" (the report says) "from lying in one position so long."

On June 20th his temperature was 101.2°; respiration 22; pulse 100, rather weak. His tongue was clean, and he wanted more to eat.

On looking at the form of the chest on this day it appeared that the bulging had greatly diminished, but on measurement it was found that there was still half an inch of difference between the two sides just below the nipple.

On examination of the chest it was found that there was a marked alteration in the physical signs. Before the operation there had been no abnormal deficiency of resonance on percussion in the back; now there was dulness up to the level of a line between the fourth and fifth dorsal spines. Over this region there was also loss of tactile vibration; there was marked tubular breathing, and there was sègophonic alteration of the voice. Anteriorly the character of the percussion note was not much altered; dulness now reached quite up to the level of the nipple, instead of beginning at a slightly lower level.

He had still, on deep inspiration, a little pain near the seat of puncture, but it was not so bad as on the previous day. He said that he could not lie either on the right or on the left side.

The physical signs thus rendered it certain that the right side of the chest contained a considerable quantity of fluid which had been poured into that cavity since the operation. It appeared hardly possible that pleurisy set up at a single spot could have given rise to the exudation of so large an amount of fluid within forty-eight hours, and particularly without the patient suffering from more severe symptoms than those described above. Hence it was concluded that the fluid was derived (in great part, at any rate) from the hydatid cyst, having entered the pleural cavity through a wound in the diaphragm made by the needle.¹

On the 21st he felt very comfortable until the evening, when, after sitting up in bed for some time, he had a little pain on the right side of his chest, and felt rather giddy.

22nd.—Pulse 68; temp. 99·8°. He now breathed without

¹ With the object of testing the applicability of this hypothesis, I introduced two needles into the body of a young healthy man, *æt.* 32, who had been killed by an accident. The circumference of the abdomen in this case was almost precisely the same as in my patient Wm. P—. The two needles were passed in the same horizontal plane (2½ inches above the umbilicus); the one 6½ inches, the other 8½ inches, from the median line. Both needles penetrated the diaphragm, the peritoneum, and the liver. The more internal one also passed through the pleural cavity without wounding the lung. The needle situated more externally passed just outside the pleura, where that membrane is reflected over the diaphragm.

Unfortunately, however, it cannot be inferred that the needles were introduced in this experiment in precisely the same situations as in the operation on William P—. They were introduced at the same distance from the median line, but then in William P— the right lower ribs were thrown outwards by the tumour. Thus the more internal needle passed between the eighth and ninth *ribs* in the experiment, whereas in Mr. Rendle's report it is stated that the needle in the operation penetrated the space between the eighth and ninth *cartilages*. If this last statement be correct (but the point is one very difficult to determine during life), it would, I believe, follow that the right pleural cavity must have been out of the track of the needles in the case of W. P—
—C. H. F.

pain, and he was allowed to have meat diet. Since the operation he had been fed chiefly upon milk.

23rd.—Pulse 68; temp. 99.4° ; respiration 16. He was in no pain, and wished to get up, saying he felt as well as ever. He woke once in the night with a cramp-like pain in the right side, which, however, lasted only a few seconds.

24th.—Pulse 56; temp. 98.2° ; resp. 18. His chest was again carefully examined, when it was found that the tubular breathing was no longer audible, nor the ægophonic bronchophony. He was allowed to get up.

25th.—Pulse 58. He was found to weigh 9 stone, 12 lbs.; he said that on the 1st of June he had weighed 10 stone, 4 lbs. With the exception of weakness, he felt quite well.

On June 27th there was no longer any marked dulness or percussion posteriorly.

July 4th.—Weight 10 stone, 2 lbs. The circumference of his chest was now $33\frac{1}{4}$ inches; before the operation it was $34\frac{1}{4}$ inches. The resonance and breathing sounds were normal on both sides of the chest. When one hand was placed on the tumour in the hypochondrium, and this was struck at another spot, a thrill was communicated to the hand.

7th.—A slight creaking rub was heard at the end of deep inspiration at the lower part of the back of the right chest.

His further progress to convalescence was uninterrupted. The tumour gradually disappeared; on August 11th the circumference of his chest was 32 inches. His weight was 10 stone, 12 lbs.

On August 14th he was sent to the convalescent establishment at Walton for a time, as he would otherwise have had to work for his living directly he left the hospital. He was then apparently quite well.

Later in the autumn he came to see Dr. Fagge at the hospital. He said that he felt stronger and in better health than he had ever been before. There was no difference between the outlines of the two sides of the chest, and no indication was left of the disease under which he had suffered.

[P.S.—In the winter of 1870–71 he was still in perfect health.]

CASE 3.—*Multiple hydatid tumours of the liver; double electrolysis; escape of fluid into the peritoneal cavity; cure. [Subsequent appearance of a third hydatid tumour. Treatment by tapping, under Dr. Rees' care.]*

J. H—, æt. 13, was admitted on May 25th, 1868, into the Royal Infirmary for the Diseases of Children and Women, under the care of Dr. Phillips, who has kindly given us notes of the case.

Two elastic tumours, nearly equal in size, could be felt in the abdomen. One occupied the epigastric region, extending on the left to the level of the nipple, and downwards to midway between the ensiform cartilage and the umbilicus. The other was situated on the right side, and extended from the margin of the ribs to the crest of the ilium. The liver itself was also much enlarged. It reached up to the fifth interspace, and its lower margin could be traced just above the umbilicus, and across to the left hypochondrium. There were some enlarged veins on the surface of the abdomen, the course of the blood in which was directed upwards.

The measurements of the abdomen crossing the tumour at two different levels were respectively $29\frac{1}{2}$ and 28 inches.

On June 17th Mr. Cooper Forster performed the operation of electrolysis in the usual manner. The child had a little sickness from the chloroform, but slept well. Next morning his tongue was a little furred. Pulse 96. No pain. Bowels relieved.

On the second day after the operation he was found to be thickly covered with urticaria, for which eruption no cause could be discovered except the operation. He complained greatly of the itching, for the relief of which sponging with vinegar and water was ordered by Dr. Shepherd.

On the 22nd Dr. Phillips noted that both the cysts felt much more flaccid and less defined. The measurements at the same levels as before were now respectively $28\frac{3}{4}$ and 28 inches. The boy suffered from no pain.

On the 25th the measurements were reduced to 28 and 27 $\frac{1}{4}$ inches respectively. The liver itself could be felt about the upper cyst, where it could not be reached previously. The boy had a good appetite and was quite comfortable. Bowels regular.

At the end of about three weeks the parts were quite flaccid in the position of the tumours.

Some time after the operation Dr. Phillips examined the boy, when no trace of the two cysts could be felt. The liver, however, was still considerably enlarged. A little to the left of the middle line there was some fulness, giving the impression that another cyst existed in the interior of the liver at that point.

By the kindness of Dr. Park, the house-surgeon at the Infirmary, this boy was sent round to Dr. Fagge in the month of March, 1870, who took him to see Mr. Cooper Forster. Scarcely any remains of the disease could now be discovered. There was still a little fulness at the epigastrium, but no defined tumour of any kind could be detected. The boy was in robust health, and engaged in earning his living at the waterside.

[P.S.—In the spring of 1871, this boy was admitted into Guy's Hospital, under Dr. Rees' care, with a tumour in the liver, at once recognised as an hydatid. It was tapped by the direction of Dr. Rees, and transparent fluid was drawn off. Dr. Phillips saw the patient on this occasion, and stated that the tumour was in a position different from that of either of those previously operated on.]

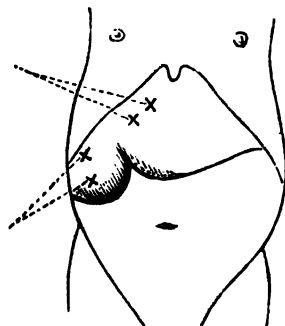
CASE 4.—Double hydatid tumour of the liver; electrolysis of each cyst; subsequent increase in size of the larger cyst; ultimate cure (?), with remains of the tumours still perceptible.

Alfred H—, æt. 4, admitted into Guy's Hospital under Dr. Rees' care, July 27th, 1868. The following notes were taken by Mr. Grigson:

The child has always been healthy, but for the last four

months the parents have noticed an enlargement of the abdomen. This is caused by the presence of a tumour, of which the form will be best indicated by the accompanying diagram (fig. 4). It appears to be seated in the liver, and has

FIG. 4.



BEFORE OPERATION.

a sharp edge extending from above the umbilicus upwards to the cartilages of the left ribs. A little to the right of the umbilicus its border presents a notch. Further to the right there is a hard swelling, extending into the loin. This is not perfectly globular, but forms a rounded ridge, of which the most prominent point is close to the notch above mentioned. It does not fluctuate, nor yield any thrill on percussion. Its hardness is remarkable.

At the epigastrium the liver is very prominent, and gives the idea of containing a rounded mass, of which the outline, however, is indistinct.

Hepatic dulness begins at the fifth rib in the mammary line, and its level gradually inclines downwards as it passes backwards.

The whole mass moves down on inspiration.

There is no tenderness.

The veins in the epigastrium and in the hypochondriac regions are distended.

On August 10th, at 2.45 p.m., Mr. Cooper Forster per-

formed the operation of electrolysis, chloroform having been previously administered. The first needle was introduced about two inches below and an inch to the right of the xiphoid cartilage. The free mobility of this needle showed that it had entered a cavity. The second needle was then passed in about three quarters of an inch below and rather to the right of the first. The two could be distinctly rubbed against one another. The current was passed in the usual manner for ten minutes, and the needles were then withdrawn. Some fluid oozed from the punctures, which was distinctly alkaline to test-paper.

Mr. Forster then proceeded to operate in the same way on the other tumour. One of the needles was introduced just below the right tenth rib, and the other an inch below and to the inner side of it. As before, the needles could be felt to touch one another within the tumour. The current was passed for ten minutes.

The child had quickly passed under the influence of the chloroform, and bore its administration well. He was sick, but soon recovered.

At 10 p.m. Dr. Fagge saw the child, and the following note was made:—"Child fretful; temperature in the groin 99.3°; pulse 136; *slight fluctuation in the lower part of the abdomen.*"

On August 11th, at 10 a.m., he was still fretful, and complained of pain in the abdomen. He had been restless all night, crying at times. Pulse 146. Tongue clean. The fact that there was distinct fluctuation in the lower part of the abdominal cavity was established by Dr. Moxon as well as by Dr. Fagge.

August 12th.—"The child had a good night, and is not fretful. The face is very flushed, and the skin feels very hot. Pulse 148. Fluctuation is still distinctly felt in the abdominal cavity."

From this time the child quickly returned to its original state of health.

On August 24th the medical registrar made the following note:—"The mass at the epigastrium is, I think, decidedly

softer, but, perhaps, is not smaller in size. The hardness of the tumour beneath the right ribs is very marked; but it seems not to extend into the loin so much as it did."

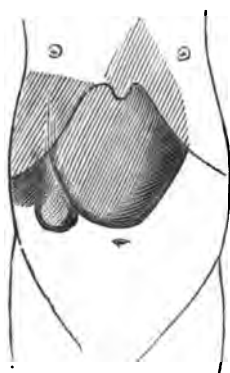
On September 21st the abdomen was measured for the first time, this having been omitted previously. At two and a quarter inches above the umbilicus it measured 22 inches.

On September 26th the circumference was 23 inches, and on October 10th 23½ inches.

On October 9th the medical registrar made the following note:—"There seems to me to have been very little alteration since August 24th. The liver, as a whole, is certainly smaller, and less prominent; it reaches much less into the loin, but the position of its free edge has not varied much. The hardness of the lower mass is unaltered. I think there is now a slight wave of fluctuation in the lower part of the abdomen."

Afterwards, however, it was found that the larger tumour was distinctly increasing in size; the ribs on the right side being everted by its growth. On November 27th the accompanying diagram was made (fig. 5). A comparison of

FIG. 5.



THREE MONTHS AFTER OPERATION

it with that made when the child was admitted shows that the tumour in the left lobe had been distinctly increasing.

It was now found to reach nearer the umbilicus, and to push outwards the right lower ribs more than formerly. Its lower edge could no longer be defined, but sank away deeply, scarcely above the umbilicus. Its most prominent point was to the right of the median line, near the cartilages of the ribs. On the other hand, the smaller mass to the right appeared to have considerably decreased in size; it now consisted simply in a nodule smaller than a walnut, just on the edge of the liver. It could not now be felt in the loin, as had formerly been the case.

It was proposed to repeat the operation of electrolysis, but from some cause this was not done, and on December 6th the child was taken out of the hospital.

Nothing more was seen of this child until May 4th, 1870, when he was brought by his mother to Dr. Fagge at the hospital. The boy then looked thin and delicate, and his mother said that he had been poorly, complaining especially of pain after taking food.

On examining the abdomen it was found that a very marked change had occurred since the case was last seen. The epigastric region was now flat or even hollowed, and perfectly soft and supple. The right costal cartilages perhaps projected slightly more than those on the left side; but the hypochondrium was no longer decidedly enlarged, and the fingers could easily be pressed upwards beneath the ribs.

The hard roundness in the right lobe of the liver could still be plainly felt, and even seen through the abdominal walls. It occupied as nearly as possible the position shown in the accompanying diagram (fig. 6), but it was decidedly smaller than formerly. The notch internal to it could still be plainly felt, and further inwards the edge of the left lobe of the liver, as shown in the diagram. It appeared, however, that this was now only a thin edge, for the hepatic dulness did not begin for a considerable distance above it. The limits of the dulness caused by the liver at this time are, in fact, pretty accurately indicated by the shading on the diagram; and from this it appears that the upper limit was situated much lower than natural, and inclined downwards in a re-

markable manner towards the side of the chest. There was no movement downwards when the child took a deep breath.

FIG. 6.



TWENTY-ONE MONTHS AFTER OPERATION.

From these facts it was inferred that the liver had long ago become fixed in the position indicated in the diagram, and that the space created by the shrinking of the tumour had been filled by the descent of the diaphragm. Probably, therefore, the size of the tumour was now really much less than would have appeared from a superficial examination of the abdomen. The child was ordered to take some cod-liver oil and steel wine; and the mother was strongly dissuaded from allowing any further operative measures to be adopted. She was, indeed, herself sufficiently impressed with the fact that the tumour, and the abdomen generally, had greatly decreased in size.

Four white cicatrices were still plainly visible, indicating the exact spots at which the needles had been introduced eighteen months before.

CASE 5 — *Multiple hydatid tumours of the liver, causing great enlargement of the organ; electrolysis of two cysts on separate occasions; escape of fluid into the peritoneal cavity; cure.*

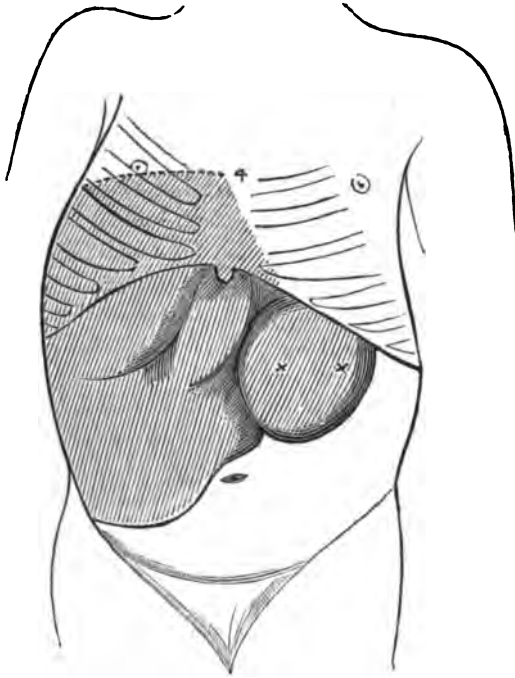
(The report of this case was taken by Mr. EUGENE S. HART, the Medical Ward Clerk.)

C. S—, æt. 7, admitted into Mary Ward under the care of Dr. Fagge, March 4th, 1869. Her father says that he first noticed a swelling in the child's abdomen about four years ago. It was then situated just below and a little to the right of the xiphoid cartilage. After its discovery it decreased in size for about two months, but since then it has been gradually growing larger and larger up to the present time. Other swellings also had made their appearance in the neighbourhood of that first observed. The father thinks that the size of the tumours varies at different times; sometimes they go down so much that they cannot be seen to project above the level of the abdominal walls.

Condition on admission.—She is rather a delicate looking child. Her abdomen is very greatly enlarged. This is mainly due to increase in size of the liver, and to the presence of tumours in that organ, which fills the whole of the right side (vide diagram, fig. 7). Its lower edge can be plainly felt in the right iliac fossa, and is traceable upwards to the umbilicus. With a little management the fingers can be pushed beneath the edge of the liver, and its surface seems rounded and convex just behind its edge, as though there were a tumour projecting from the under surface. Growing from the upper (anterior) surface of the organ there are two or perhaps three distinct tumours. The most prominent of these is situated in the left side of the abdomen, reaching from near the umbilicus to the cartilages of the left ribs. It is spherical in form, fluctuates distinctly, and appears to occupy the edge of the left lobe of the liver, so that no sharp edge to this lobe can be felt. Another tumour passes beneath the margins of the right ribs, and bulges them out. Fluctuation in this tumour is obscure. Between it and the

one first mentioned there is an oblong elevation, having a depression on either side of it, which is, perhaps, a third cyst wedged between them. The lower part of the right lobe is smooth and apparently free from cysts. As has been already

FIG. 7.



mentioned, however, there seems to be a tumour projecting from the under surface of the organ.

The enormous increase in the size of the abdomen, expanding the ribs, causes the chest to have a very shallow form. The liver has also pushed the right side of the diaphragm upwards to a considerable extent. The line of hepatic dulness begins in front at the upper border of the fourth rib, and gradually descends as it is traced backwards to the spine. The vertical measurement of the hepatic

dulness is, on the right side, $8\frac{1}{2}$ inches; on the left side dulness appears to begin at the sixth rib, and reaches down to the level of the umbilicus.

On March 11th the operation of electrolysis was performed by Mr. Durham on the most prominent of the cysts (that to the left of the median line). Two needles were introduced about two inches apart. They could be felt freely rubbing against one another. The current was passed for twelve minutes. They were then withdrawn, and strapping was applied.

In consequence of some misunderstanding the child had had her dinner as usual, and she vomited repeatedly from the chloroform. After the operation the cyst was found to be much softer; in fact, it could no longer be distinctly felt. It was thought by Mr. Durham that the cyst was ruptured by the vomiting, but Dr. Fagge's impression was that the cyst had become softer before much vomiting occurred. At 8 p.m. the pulse was 106. At 10 p.m. the pulse was 124; respiration 28; temperature 99° .

On the following day (March 12th) the child complained of pain over the cyst; there was also slight tenderness on pressure, but the tumour was softer. There was distinct fluctuation at the lower part of the abdomen. The child had been very sick in the night, and looked pale. Morning temperature 99.1° ; pulse 136; resp. 40. Evening temperature 98.8° ; pulse 128; resp. 24.

On March 18th there was still fluid in the abdomen. The cyst was much softer. Measurement seemed to show that the size of the abdomen was increased. The circumference was now $25\frac{1}{2}$ inches, as compared with $24\frac{1}{2}$ inches before the operation.

On March 14th Dr. Fagge noticed that the fluctuation in the abdomen was much less distinct, and by the 22nd it had entirely disappeared. The circumference of the abdomen was again $24\frac{1}{2}$ inches. The child had quite recovered the effects of the operation.

On March 22nd electrolysis was again performed, two needles being inserted, at a distance of one and a half inch

from each other, into the cyst on the right side. They could be rubbed freely against one another. The current was passed for twelve minutes, after which the cyst was observed to be plainly more tense than before. A drop of clear fluid appeared at the seat of puncture when one of the needles was withdrawn.

Immediately after the operation no fluid could be detected in the abdomen. About an hour afterwards (the girl having been sick in the interval), fluctuation was distinctly felt, and the cyst was much softer. The patient looked very pale, and was in much pain. Temp. 97° ; pulse 102; resp. 24.

On March 23rd she had no pain in the cyst last operated on, which was much softer than before. She, however, complained of pain in the tumour that had been the seat of the first operation. She looked pale. In the night she had been very thirsty, and drank a great deal of milk, after which she was very sick. Temp. 99.8° ; pulse 138; resp. 37.

There was distinct fluctuation both in the cyst and in the lower part of the abdomen. The right side did not bulge so much as before the operation.

On March 24th the child was very much better. She was no longer feverish, and had no pain. Temp. 98° ; pulse 106; resp. 29.

There was still fluctuation in the abdomen, which now measured 27 inches in circumference.

By March 26th she had quite recovered from the effects of the operation.

On April 8th the following notes were made by Dr. Fagge:

"There is no doubt about the diminution in the size of the tumours. The sharp edge of the right lobe of the liver, which was formerly felt close to the umbilicus, now passes half an inch above and to the right of it. Immediately above this edge the surface has a tense elastic feel, as if there were a third cyst; and this may, perhaps, be the one that has been supposed to exist on the under surface of the liver, and to be discoverable as a rounded projection when the fingers are made to pass beneath the edge of the organ.

The two cysts that were operated on are decidedly smaller. The fingers can now be pushed upwards under the right costal cartilages. Just below the line of the ribs on this side a ridge can be felt running nearly parallel with it, and apparently corresponding with the lower border of the right cyst. The tumour in the left lobe (that first operated on) is now quite soft and supple; it is surrounded by a kind of raised border or rim (the edge of the liver substance round it). The sharp edge of the left lobe can now be clearly defined running up towards the left ninth rib. Only a narrow edge can be felt in this position, the rounded tumour being apparently traceable below it, and thus extending completely through the thickness of the lobe.

There is now tympanitic resonance for two inches above the umbilicus, in the position of the notch between the right and left lobes of the liver.

On April 28th the child was sent home, the father undertaking that she should be brought to the hospital at the end of a month. This, however, he neglected to do, and nothing was heard of the child for some time. In the month of October Dr. Fagge sought her out with some difficulty, her father having removed to the neighbourhood of Newgate. A few days later she was brought down to Guy's and was then examined carefully. An obscure fulness was all that remained of the large tumours that had existed in the abdomen. A photograph was taken. Prints from this and other photographs illustrating the present paper are in the Collection belonging to the Society.

CASE 6.—*Hydatid tumour reaching convex surface of liver ; electrolysis ; escape of fluid into peritoneal cavity ; patient discharged from hospital on seventeenth day ; cure complete within six months.*

(The following report was taken by Mr. W. T. P. DOUGLAS, B.A., Clinical Clerk.)

E. M.—, æt. 9, was admitted into Miriam Ward under the care of Dr. Fagge, August 3rd, 1869. Her mother states

that she always enjoyed good health. Since last Christmas, however, she has occasionally complained of some pain in the right side and down the right arm, and a swelling has been noticed in the right side of the abdomen.

The child is of a darkish complexion. She is very lively, and appears to suffer in no way, except with occasional pain in the right arm and about the region of the swelling, a diagram of which is annexed (fig. 8).

FIG. 8.



There is marked bulging of the lower part of the chest, and of the right side and front of the abdomen. Dulness on percussion begins above on the sixth rib, and extends in the mammary line to a level with the umbilicus. There is no sense of fluctuation, nor any thrill on percussion over the tumour, but it has a peculiar elastic feel. The edge of the liver at its lowest part is sharp and well defined. No fluid can be discovered in the peritoneal cavity.

On August 19th Mr. Durham performed the operation of electrolysis. The current was passed for ten minutes.

An hour and a half after the operation the temperature in the axilla was $99\cdot6^{\circ}$ Fahr.

At 10 p.m. the temperature was $102\cdot6^{\circ}$ Fahr.

On August 20th the morning temperature was $102\cdot6^{\circ}$; pulse 164; resp. 32. Tongue coated with white fur. There was a rash over the body, very much resembling that of scarlatina, but of a lighter shade. There was evidence of the presence of fluid in the peritoneal cavity.

On August 21st the morning temperature was $100\cdot1^{\circ}$ Fahr.; pulse 116; resp. 23. The evening temperature was $102\cdot4^{\circ}$.

On August 23rd the temp. was $100\cdot8^{\circ}$; pulse 106. The child was very much livelier; the tongue was clearing.

The tumour had decreased in size, and was no longer elastic. The fingers could now be pressed upwards beneath the margin of the ribs on the right side.

On August 24th the temp. was $99\cdot8^{\circ}$.

September 3rd.—The child was taken home, in perfectly good health. There was still bulging of the right side, but the swelling had considerably decreased in size.

Nothing further was seen of the patient until the month of April, 1870, when, at Dr. Fagge's request, she was brought to his house. An examination of the abdomen showed that the tumour had entirely disappeared, leaving at most a slight fulness of the epigastrium.

The ribs had returned to their proper position, and the symmetry of the chest was restored.

CASE 7.—Hydatid tumour of left lobe of liver; electrolysis; patient discharged from hospital ten days afterwards; marked diminution of size; case still under observation.

(The report of this case was taken by Mr. RICHARD GALPIN, Medical Ward Clerk.)

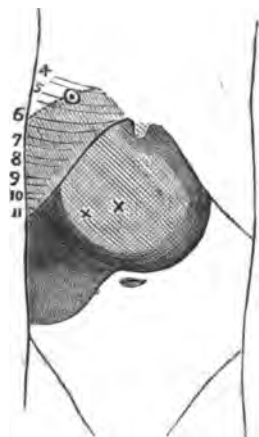
Alfred C—, æt. $5\frac{1}{2}$ years, was admitted into Guy's Hospital, under the care of Dr. Fagge, February 23rd, 1870. The boy's mother had first noticed about two years before that

he had a swelling on the right side, just below and external to the nipple. This gradually increased in size, growing downwards, and his abdomen soon afterwards began to enlarge and to feel hard. He has never complained much of pain, and has always been well enough to keep about. At times he seems rather weak, but he has never had any serious illness, except whooping-cough and measles when he was two years old.

On admission the patient is a fair-complexioned child; he is tolerably well nourished, but looks rather anæmic.

The two sides of his body are unequally curved, there being a greater prominence of the right side. The ribs on the right side are pushed upwards and outwards by a tumour which occupies the right hypochondriac and epigastric regions, and also extends into the left hypochondrium, as well as into the right lumbar and the umbilical regions. Its form and characters will be best indicated by the accompanying diagram (fig. 9).

FIG. 9.



The hepatic dulness begins above at the level of the nipple, or even a little higher.

The tumour appears to occupy especially the left lobe of the liver, which cannot be felt to have any sharp margin.

The part of it which projects most strongly is that which is least deeply shaded in the diagram. It pushes outwards the right ribs so firmly that one cannot get the fingers under their edge, or even depress the integument sufficiently to bring the line of the cartilages prominently into view. The circular measurement of the abdomen $2\frac{1}{2}$ inches above the umbilicus is 22 inches. The tumour is not tender on pressure. It moves freely with the breathing movements of the child. On percussion a slight thrill can be felt through it. The superficial veins of the abdomen are much distended, especially on the right side. Neither ascites nor jaundice is present, nor is there any œdema of the lower extremities.

Below the tumour a considerable part of the right lobe of the liver appears to remain in the natural condition. It reaches nearly downwards to the crista ilii, and has the sharp edge normally characterising the organ.

On February 28 the operation of electrolysis was performed by Mr. Durham in the usual manner. A battery of ten cells was employed. The child was placed under chloroform. The two needles were introduced at the points indicated in the diagram by asterisks; one about three inches above the umbilicus, and a quarter of an inch to the right of the median line; the other one and a half inch further to the right, and half an inch lower down. The current was allowed to pass for twenty minutes. The redness round the punctures was not so marked as usual, but it was known that the battery was in a feeble condition, a long interval having elapsed since it was charged. The needles could be freely moved within the tumour, and could be rubbed against one another. Upon the withdrawal of the lower needle about two drops of a clear fluid came away; this had a strongly alkaline reaction. The operation was completed at about 3.45 p.m.

At 4.15 (about half an hour afterwards) the child had almost recovered from the effects of the chloroform. He had been carefully watched, and there was no vomiting nor retching. The abdomen was already quite flaccid, and the fingers could be passed under the edges of the ribs. P. 84; R. 24; temp. 97° (?). No fluctuation discoverable in the

abdomen. The child's mother visited him in the course of the afternoon. He appeared perfectly free from pain, and was as cheerful as usual.

At 9 p.m.—P. 86; T. 97·4°; R. 24. The child was sleeping tranquilly. Dr. Fagge saw the child, and noted that the upper part of the abdomen was soft and pulpy. Fluctuation, if any, was very doubtful.

March 1st.—He slept perfectly well until 3 a.m., after which his repose was interrupted at intervals until the morning. After eating some sugar this morning he vomited a little, otherwise there had been no disturbance from the operation. The tongue was slightly furred. P. 94; R. 30; T. 98·4°. He did not complain of any pain in the abdomen. On pressure he said "it hurt him, but not much." There was no redness round the punctures. He took his food well, beef tea and milk being alone allowed him. The measurement round the abdomen at the same level as before was 23½ inches (indicating a decrease of 1½ inch).

2nd.—He slept well last night. There was no tenderness on pressure on the abdomen. Tongue slightly furred. P. 90; R. 24. His appetite was good. The measurement round the abdomen was 20 inches.

3rd.—His tongue was clean; he had slept soundly, and seemed much better this morning. The measurement was now 22 inches.

On March 4th he was up, and about the ward. Six days later he was discharged from the hospital.

On March 28th his mother brought him to Dr. Fagge, stating that for about a fortnight he had had a bad cough, and that he had been falling away. She thought that his symptoms were very similar to those of another child who had died of consumption. The boy was at once readmitted, and on examination it was found that at the right apex posteriorly there were dulness, bronchial breathing, and bronchophony.

The hepatic tumour was much less defined than formerly.

Cod-liver oil and steel wine were prescribed, and under this treatment the child rapidly improved in condition, and

left the hospital on April 27th. The hydatid tumour of the liver continued to decrease in size.

[P.S.—In July, 1871, the child was again examined, and it was found that the tumour (although traces of it were still perceptible) was reduced to insignificant dimensions.]

CASE 8.—Hydatid tumour of liver ; electrolysis ; persistent febrile disturbance ; diminution in size of tumour ; case still under observation.

(From notes taken by the Clinical Clerk, Mr. E. H. STEELE.)

Eliza M—, *set.* 27, admitted into Guy's Hospital, under the care of Dr. Wilks, March 23rd, 1870. She is a married woman, and has three children.

About four years ago she began to suffer from a numbing pain in the right hypochondrium, accompanied by a "dragging-down" sensation in the same region. These symptoms have lasted more or less up to the present time. For the last year and a half she has not been able to do her work as usual. A year ago last January she was coming down stairs one day, when something seemed to give way beneath the ribs on the right side, accompanied with intense pain. She had to be carried to bed, and remained in bed for a week. Ten days ago she had a similar, but less severe, attack.

About a year ago she first noticed a bulging in the right hypochondrium. This has since increased in size, proceeding in a downwards direction, and quite recently passing across the abdomen to the left side. For some time past she has been unable to lie on the right side on account of the pain produced by such a posture. When she lies on the left side a weight seems to fall over on to that side. For the last eighteen months she has been unable to wear stays on account of the swelling of the abdomen. Her left leg and foot are also swollen in the evening, but the swelling subsides in the course of the night.

Latterly she has suffered much from indigestion, spasms,

and bilious attacks, with vomiting. She has had no jaundice, but has been rather sallow.

Menstruation has been quite regular. She has had a miscarriage since she discovered the swelling in the right side.

She is a nervous, sensitive woman, and there is consequently some difficulty in making a thorough examination of the abdomen.

The tumour in the abdomen now pushes out the lower ribs on the right side. It extends downwards to within $3\frac{1}{2}$ inches of the anterior superior spine of the ilium on the right side, and to within $1\frac{1}{2}$ inch of the umbilicus. It is firm and elastic; it does not fluctuate distinctly, but yields a thrill when gently tapped.

Before her admission she consulted Dr. Wilks, who advised her to come into the hospital. She had previously seen Dr. Hicks, having been sent to him by her medical attendant, on account of some supposed uterine disorder; of this, however, Dr. Hicks could find no evidence.

On March 26th Mr. Durham saw the case with Dr. Wilks, and agreed with him that it was one of hydatid disease of the liver.

On March 28th, at 8 p.m., the operation of electrolysis was performed by Mr. Durham in the usual manner. The needles could be freely rubbed against one another in the interior of the tumour. The current was passed during a period of sixteen minutes. A little fluid escaped as they were withdrawn. On her admission the temperature (taken on two occasions) was normal, the pulse 70. At 4.5 p.m. T. 99.8° ; P. 64. She feels faint. At 9.30 p.m. T. 101.4° ; P. 98.

March 29th.—She had no sleep last night. Her bowels are confined. Tongue white, furred. Morn. T. 102.1° ; P. 112. In the afternoon she fainted. A mixture was therefore prescribed containing Spir. Ammon. Aromat., Tinct. Sumbul, Spir. Chloroform., in Aq. Menth. Pip. 9.30 p.m.—T. 102.4° ; P. 120. She is sweating freely.

30th.—Morn. T. 102.6° ; P. 104. Even. T. 102.6° ; P. 100.

31st.—Morn. T. 99° ; P. 104. Even. T. 100° ; P. 96.

April 1st.—Morn. T. $100\cdot2^{\circ}$; P. 96. Bowels still confined; tongue white and furred. She is sleepless, and she eats nothing.

2nd.—She had shivering last night, with cold and hot sweats. She is low-spirited. The bowels have been open. Morn. T. 102° ; P. 120. Even. T. $102\cdot2^{\circ}$.

3rd.—Morn. T. $100\cdot3^{\circ}$; P. 98. Even. T. $102\cdot2^{\circ}$; P. 104.

4th.—Morn. T. $100\cdot1^{\circ}$; P. 104. Even. T. $100\cdot1^{\circ}$; P. 104.

5th.—Morn. T. $103\cdot4^{\circ}$; P. 108. Even. T. $100\cdot2^{\circ}$; P. 94.

6th.—Morn. T. $101\cdot4^{\circ}$; P. 96. Even. T. $102\cdot2^{\circ}$; P. 92.

7th.—Morn. T. $102\cdot6^{\circ}$; P. 88. Even. T. 103° ; P. 96.

Her appetite has improved somewhat. There is no perceptible diminution of the bulging, but the tumour does not appear to be so tense. She still complains of the dragging pain in the hypochondrium. She ought to have menstruated this week, but has merely had a greenish discharge.

8th.—Morn. T. $102\cdot7^{\circ}$; P. 98. Even. T. $102\cdot4$; P. 98. Ordered Mist. Effervescentis *ziss*, t. d.

9th.—Morn. T. $101\cdot4^{\circ}$; P. 88. Even. T. 101° .

10th.—Even. T. 101° ; P. 86. On this day she got up for the first time.

11th.—Morn. T. 101° ; P. 86. Even. T. $101\cdot7^{\circ}$; P. 96.

12th.—Morn. T. $100\cdot6^{\circ}$; P. 70. Even. T. $101\cdot1^{\circ}$; P. 76.

13th.—Morn. T. $101\cdot2^{\circ}$; P. 96. Even. T. $100\cdot8^{\circ}$; P. 87.

14th.—Morn. T. 100° ; P. 83. Even. T. $100\cdot4^{\circ}$; P. 84.

15th.—Morn. T. $99\cdot5^{\circ}$; P. 84. Even. T. $99\cdot5^{\circ}$; P. 72.

16th.—Morn. T. 100° ; P. 80. She goes out to-day. Her appetite and general health have been improving, but she still has the pain in the right hypochondrium. The tumour is certainly not so tense, and the thrill on percussion is less evident. The area of dulness has not diminished.

At this time the circumference of the abdomen, taken by Mr. Steele, the clinical clerk, was $30\frac{1}{4}$ inches at a level $2\frac{1}{4}$ inches above the umbilicus, and in a line with the twelfth dorsal spine; of this the right half measured $15\frac{1}{4}$, the left $14\frac{1}{4}$ inches. At the level of the ensiform cartilage and the eighth dorsal spine the circumference was $31\frac{1}{4}$ inches; the right half measuring $16\frac{1}{4}$ inches, the left half $15\frac{1}{4}$ inches.

Unfortunately no measurements were made before the operation.

In this case there was at no time after the operation any well-marked fluctuation in the abdominal cavity.

On April 29th she came to the hospital and saw Mr. Durham, who satisfied himself that there was a decided diminution in the tumour. She was in good health, and complained bitterly of having been kept so long in the hospital.

[P.S.—The patient has been repeatedly seen and carefully examined since she left the hospital. The tumour has been gradually diminishing; and when she was last seen (in December, 1870), but little trace of it could be discovered. Her general health has become excellent, far better than it had been for some time before the operation.]

In all the cases thus recorded the method adopted has been almost absolutely the same. The following have been its chief features.

No exploratory puncture nor operation of paracentesis was performed in any instance. Experience has fully shown that the removal of a part of the fluid from an hydatid cyst by simple tapping in many cases effects a cure. If, therefore, in any of our cases the cyst had been first tapped, the cure of the disease could not have been attributed with certainty to the operation of electrolysis. A preliminary paracentesis would have been further objectionable, as exposing the patient to the risk of having suppuration set up; the avoidance of which is, in our opinion, one of the main reasons for preferring the operation of electrolysis to that of simple tapping.

The diagnosis of the nature of the disease was, therefore, in every instance a matter of inference, and was substantiated neither by chemical analysis of liquid removed from the tumour, nor by the discovery of any scolices, hooklets, or other portions of the Echinococcus. It was considered that the presence of an hydatid tumour was, for all practical

purposes, proved by the recognition of one or more rounded cystic tumours evidently growing from the liver, projecting into the abdomen, or pushing the right lower ribs outwards, and not attended by pain nor any marked disturbance of the general health. The *cystic* character of the tumour was shown, not only by the sensation of fluctuation, but also by the fact that the two needles used in the operation could be freely moved about in the interior of the tumour, and distinctly made to touch and rub together, although introduced at a distance from each other. This was clearly established in each instance.

The operation was performed in general accordance with the directions given by Dr. Althaus for the cure of other diseases by the electrolytic method. Two electrolytic needles were passed into the tumour, one or two inches apart; they were then attached to two metallic wires, both connected with the negative pole of a galvanic battery of ten cells.¹ A moistened sponge formed the termination of the positive pole, and this was placed on the patient's skin at a little distance from the points of entrance of the needles. Its position was changed from time to time during the operation. The current was allowed to pass for about ten minutes in some cases, and in others for a somewhat longer period. At the end of this time the needles were gently withdrawn, and the seats of puncture were covered with adhesive plaister. In two or three instances a minute quantity of clear fluid exuded on the removal of the needles; and in one case (the current having been passed for an unusually long time) the tissues immediately around the punctures became slightly emphysematous.

In the case of the young man, W. P.—(Case 2), chloroform was not considered necessary; but it was administered in all the other cases.

The immediate result of the operation appeared to vary somewhat in different cases so far as the condition of the

¹ Immediately before the introduction of the needles, it was, of course, ascertained that the decomposition of a saline solution was readily effected by the current.

tumour was concerned. In one instance (Case 5) it was thought that the cyst was harder and more tense directly after electrolysis than it had been before. In other cases it was observed, even before the operation was completed, that the tumour was softer and less prominent. This could hardly be due to any other cause than the escape of some of the contained fluid through the apertures made by the needles into the serous cavity in which the tumour lay. That such an escape really took place was further indicated in three cases by fluctuation presenting itself in the lower part of the abdominal cavity soon after the operation and continuing during some days. In one case (Case 2), in which the needles were introduced through the lower inter-costal spaces on the right side, it even seemed that the fluid was poured into the right pleural cavity.

Again, as regards the production of pain and constitutional disturbance, the effects of the operation varied considerably in different cases. In most instances more or less pain came on after a time, when the effects of the chloroform had passed off. The patient, if a child, became fretful; there was also some febrile disturbance, the temperature rising to 99.5° , 101° , or even 102.6° . By the third or fourth day, however, all these symptoms generally subsided. In one instance, indeed (Case 8), the temperature remained high for at least nineteen days after the operation, ranging from 102.6° to 100° , below which point it was registered on only two or three occasions, although careful observations were made.

In one instance (Case 7), however, no symptoms whatever could be discovered to result from the operation. The child complained of no pain, and appeared as lively and cheerful as usual; and no elevation of temperature was at any time noted, notwithstanding that the thermometer was employed regularly both in the morning and in the evening. On the fourth day the child was up and about the ward. It is worthy of especial note, however, that this is the one case, already referred to, in which the result still remains doubtful.

In two instances (Cases 3 and 6) a rash made its appearance soon after the operation; in one on the first, in the other on the second day. In the former case the rash resembled that of scarlatina; in the latter it was an urticaria. In reference to this point, it may be interesting to note that Dr. McGillivray¹ has recorded the occurrence of an intense urticaria in a man, aged 56, affected with hydatid disease of the liver, who one day complained of sharp burning pain in the abdomen, and said he had felt something suddenly give way. The tumour was found on examination to be considerably smaller, and it was evident that part of its contents had escaped into the abdominal cavity. The urticaria, which lasted for about three days, must have come on within a quarter of an hour after the escape of the hydatid fluid.

The period required for the cure of hydatid disease of the liver, by the method just described, no doubt varies with the size and position of the tumour. On this point our cases afford no precise information. In scarcely any one of them was the patient under continuous observation during the diminution and disappearance of the tumour. At a variable period after the operation each patient was sent home, and told to return for examination after a certain interval should have elapsed. Some neglected to do so; and, consequently, it was not until they were sought out some considerable time afterwards, that the perfect success of the treatment was ascertained.

The constitutional disturbance produced by the operation has been so slight, that in our later cases the patients have actually been discharged from the hospital within two or three weeks after its performance. In each case in which we had the opportunity of examining the patient from three to six months after electrolysis, we found, as a rule, that the tumour had very manifestly decreased in size. In some instances no trace of the disease could be discovered.

The success of the operation, however, is not always so immediate. In our first case, at the end of ten weeks it was

¹ 'Australian Med. Journal,' 1865, p. 245.

thought that the tumour was not decidedly smaller than before: nevertheless a year afterwards it had entirely disappeared. In Case 4, at the end of four months one of the two cysts that had been operated upon was even larger than at first; but eighteen months later, without further treatment, the tumour in the abdomen was found to be comparatively insignificant in size; the disease was probably cured, for there was evidence that the liver had become fixed at a lower level than natural; and this appeared to be the main cause of the swelling that could still be felt.

With regard to the treatment by simple tapping, Dr. Murchison has remarked that the fact of an hydatid tumour filling out again after one operation is no proof that a second will be required. The two cases just referred to show that this remark is also applicable to the treatment by electrolysis. If the surgeon will be content to wait, he will often find that although the tumour may for a time retain or resume its original dimensions, yet sooner or later it will begin to shrink and will ultimately disappear.

In any case in which an hydatid tumour is observed to increase in size after treatment, whether by simple tapping or by electrolysis, it would be interesting to ascertain the character of the fluid to which the increase is due. If on examination the fluid should be found to be albuminous, it might fairly be considered to have been derived from the surrounding human tissues, and to afford no indication of continued vital action on the part of the hydatid itself.

It is not difficult to understand why in some cases an almost immediate disappearance of the tumour should occur after operation, while in others a considerable time elapses before any marked diminution is perceptible. If the cyst or any considerable portion of it is deeply imbedded in the substance of the liver, it is obvious that a great length of time must be requisite for the filling up of the cavity in the solid organ in which it is situated. If, on the other hand, the cyst is almost or entirely superficial in its connexion with the liver, the evacuation or absorption of its contents may be fol-

lowed by the comparatively speedy disappearance of the tumour.

The number of cases of hydatid disease which have been treated by electrolysis is probably as yet insufficient to enable us to say with certainty that the operation will invariably cure the disease. Hitherto, however, we have not met with any instance of failure. In three cases the tumour has disappeared so entirely that no trace of it can be discovered. In each of these cases the cyst was probably very large; and in one of them there were at least two cysts, which were operated on separately. In three cases, some ill-defined fulness existed when the patient was last seen. In another case, in which there were two distinct tumours, a mass the size of a walnut can still be felt. But this was originally much larger, and presented from the first a peculiar stony hardness, which it still retains, and which may possibly have prevented its more complete disappearance. The other tumour, which was electrolysed separately, has undergone a very decided diminution; and this would probably be far more marked were it not that the liver has apparently become abnormally adherent to the abdominal parietes. In the remaining case the tumour, although much less tense, was still of considerable size when last examined. It is, therefore, doubtful whether in this case any great good has been effected by the operation.¹

As regards the *modus operandi* of electrolysis in the cure of hydatid tumours there is, we think, at present room for doubt. We have already stated that in several instances we have been able to detect the presence of fluid in the peritoneal cavity (and, in one instance, even in the pleural cavity) very soon after the operation, and that we believe this to have resulted from the passage of part of the hydatid fluid through the apertures made by the needles. It has

¹ Reference to the postscript to the report, however, will show that the further progress of this case renders it entitled to be now considered as successful.

occurred to us that this may perhaps be an essential element in the success of the operation. It is well known that simple tapping of an hydatid cyst is often sufficient to cure the disease; and it may be that electrolysis is, as it were, in effect a kind of subcutaneous tapping, with effusion of the cyst fluid into a serous cavity. We have even thought that the hydrogen gas set free within the tumour by the electrolytic action of the current, accumulating in the upper part of the cyst, may cause a pressure sufficient to *force out* the fluid, either by the side of the needles during the operation, or subsequently through the apertures made by them. If this be not the case, an equally successful result might possibly be attained by simple acupuncture of an hydatid tumour. On this point further illustration is afforded in the addendum to our paper.

We are aware that it may be urged, in opposition to this view, that hydatid fluid is generally believed to exert an intensely irritant action on serous membranes. Many instances have indeed been recorded in which death has been rapidly brought about by the rupture of hydatid cysts and the pouring out of their contents into the peritoneal cavity.

But it has not in reality been shown that in these cases the fatal result has been due to the presence of mere hydatid fluid. Secondary cysts and scolices are often present in large numbers in hydatid tumours. The escape of such cysts or scolices into the serous cavity probably explains the severe irritation which has sometimes been set up when accidental rupture has occurred; and which the chemically inert hydatid fluid appears to us incapable of producing. Authorities on the subject, indeed, are not unanimous in considering the entrance of this fluid into the peritoneal sac as necessarily dangerous. M. Malgaigne¹ has expressed his belief that it is innocuous. Some years ago a discussion on this question took place in the Société de Chirurgie of Paris; and M. Giralès² then asserted that he had seen a large hydatid

¹ 'Traité de Méd. Opératoire,' 6ème ed., p. 521.

² 'Bull. de la Soc. de Chir.,' I, p. 550. A similar case of Dr. MacGillivray's will be found referred to at p. 34.

tumour, when ruptured, give rise to an ascites without any danger to the patient. This would be quite explicable if we admit the ordinary consequences of the rupture of an hydatid cyst to be due to the escape of secondary cysts and scolices; for the cyst in M. Giraldès' case may have been one of those sterile hydatids which are properly called acephalocysts. The same view would, we think, also account for the immunity with which, as it appears, the contents of hydatid cysts enter serous cavities after operations. The minute openings made by the needles in the operation of electrolysis could only permit the passage of the scolices, and these are experimentally found to sink rapidly by gravitation in a vessel of hydatid fluid. It is therefore quite unlikely that they would be found in any but the most dependent part of a cyst. It is true that scolices are not infrequently found in the fluid removed through the trochar, in the operation of paracentesis; but our experience goes to show that they escape only towards the end of the tapping, and after some more or less considerable manipulation of the tumour.

In submitting this suggestion as to the *modus operandi* of electrolysis in the cure of hydatid disease, we do not wish to ignore the possible effect which the galvanic action may have in destroying the life of the parasite—either directly, or indirectly by the chemical decomposition of its fluid.

If our view should prove to be tenable, it evidently becomes a matter of great importance to determine whether the cyst contains the ordinary pellucid saline fluid, or whether supuration has taken place. We have, therefore, taken some pains to ascertain whether cases in which pus has been removed from hydatid tumours on first tapping have invariably presented such symptoms as would have indicated its formation. The result of our inquiries affords satisfactory evidence on this point. Apart from our own experience and observation we may state that among the cases collected by Dr. John Harley there are at least ten or twelve in which pus was removed at the first tapping. In all of those in which the earlier symptoms are fully stated, it appears to us

that indications of suppuration had clearly manifested themselves before any operation was performed.

In other cases of hydatid disease, again, bile has been found in greater or less quantity in the fluid removed by tapping. But when this has occurred, the patient has generally presented symptoms which would have sufficiently distinguished the case from ordinary instances of painless hydatid tumours. A very striking example is afforded by a case of Dr. Greenhow's,¹ which stands as No. 4 in Dr. Harley's Tables. The patient was greatly emaciated and haggard; he had occasionally severe pain in the abdomen; his pulse was 100; his conjunctivæ were yellow; his urine contained bile. In another case, recorded by Dr. Brinton² (No. 30 in Dr. Harley's Tables), the fluid was only faintly greenish; but the patient had suffered "both pain and disablement."

It is well known that in cases in which bile has been found in hydatid cysts, Cruveilhier and other authorities have attributed the death of the parasites to some poisonous influence exerted by this secretion. It seems to us that there is no sufficient evidence to prove that such is the case. On the contrary, we would venture to suggest that the entrance of bile into an hydatid cyst probably takes place only after the parasite has already ceased to live, and depends in great measure upon some accidental local relation. We have recently made a post-mortem examination in which several hydatid cysts were found in the liver. All of them were dead: in some there was an admixture of bile, in others the contents were colourless.

To revert to the especial subject of this communication, viz., the treatment of hydatid tumours of the liver by electrolysis:—We venture to claim for this method the following advantages:—1. That the operation itself is altogether free from danger; 2. That it is not liable to set up suppuration within the cyst, and thus indirectly to involve the patient in serious risk.

¹ 'Lancet,' 1862, vol. ii, p. 476.

² Ibid., p. 639.

Now, as regards immediate danger to life, it may be at once stated that simple tapping with a fine trochar would appear to leave very little to be accomplished by any alternative procedure. Dr. Murchison has shown¹ that, of forty-six cases treated by "simple puncture and closure of the opening after paracentesis," only three terminated fatally; and in each of these three the death of the patient could fairly be attributed in great measure to some other cause, and not solely to the operation itself. Our own experience in some eight cases treated by simple tapping has been equally favorable.

This conclusion is very different from that arrived at by Dr. John Harley, and enunciated by him in the 49th volume of the 'Transactions' of this Society. According to Dr. Harley, "in thirty-four cases treated by a single puncture, there were eleven cures, ten recoveries, i. e. cases which were relieved by the operation, but which, since the tumour was not wholly removed, or the result sufficiently certified, cannot be regarded as radical cures, and ten deaths."

In the first place, we may remark that the arrangement of Dr. Harley's tables appears to us to be very artificial. The cases arranged in his first table are those stated to have been treated by single puncture; and his second table is made up of cases in each of which the operation was repeated once or oftener. Now, it is obvious that the difference is one not of *method of treatment*, but of *result*, the fact being that in some of the cases tapping was followed either by reaccumulation of fluid or by suppuration; and that a second operation was consequently requisite. It is indisputable that all such cases should be taken into account in estimating the results of simple tapping. It will be found, on analysis, that forty-five of the whole number of cases collected by Dr. Harley may fairly be considered as examples of this operation, although thirty-four only are included in his first table.

In the next place, it would appear from Dr. Harley's tabular statement that fatal results ensued in ten out of the thirty-four cases treated by single puncture. The fallacy of

¹ 'Clinical Treatise on Diseases of the Liver,' 1868, p. 118.

this statistical conclusion has been clearly proved by Dr. Murchison, who has investigated the details of the ten cases referred to, and has shown that the operation could be regarded as having caused the death of the patient *in only one case out of the whole number*. In three instances the paracentesis was performed only as a palliative. In two there was suppuration within the cyst before the first operation, as was clearly indicated by the usual local and constitutional signs and symptoms. In one the patient died of tetanus twenty-five days after the puncture, which was simply exploratory, and which (in the words of M. Récamier, who reports the case) "was followed by no accident." The tetanus supervened on the application of caustic potash seven days after the puncture. Lastly, in one case it is by no means certain that the patient did not recover.

The table given by Dr. Murchison, and those appended to Dr. Harley's paper, in the 49th volume of the 'Transactions' of this Society, may be compared without much difficulty, they having been derived, for the most part, from the same sources. They differ chiefly in this—that Dr. Murchison has included the cases recently published¹ by Dr. McGillivray, of Australia, and that he has critically excluded all those in Dr. Harley's collection in which the operation of simple paracentesis cannot be said to have had a fair trial. We have been at some pains to verify the grounds of such exclusion in each instance; and we can entirely confirm, in all essential particulars, the accuracy of Dr. Murchison's tabular statement. According to this, as we have already stated, out of forty-six patients with hydatid tumours of the liver operated on by simple puncture, only three died.

But, when regarded from another point of view, Dr. Murchison's statistics, like those of Dr. Harley, show that simple tapping of an hydatid tumour frequently fails to accomplish *directly* the object aimed at, even though the patient may ultimately recover. In ten out of the forty-six cases collected by Dr. Murchison the first tapping was

¹ 'Australian Med. Journal,' 1865, p. 245.

followed by suppuration within the cyst. This rendered a second operation necessary, and ultimately a free external opening was formed, which, in some instances, did not close for many months.

Now, it is true that in practice a fatal result has rarely occurred. But, nevertheless, this process of cure, preceded as it may be by prolonged suppuration, is obviously attended by considerable *indirect* risk ; and, moreover, must always cause the patient severe suffering. On the other hand, so far as our experience has gone, it appears that the treatment by electrolysis is not likely to cause suppuration in the tumours operated upon, nor, indeed, in any other way to give rise to indirect risk or suffering.

In conclusion, therefore, we venture to express our belief that, if the results we have hitherto obtained be confirmed by further experience, an advance will have been established in the treatment of hydatid tumours of the liver as well as of other internal organs.

Addendum.

Since this paper was presented to the Council of the Society, an opportunity has occurred of trying the effects of simple acupuncture of an hydatid tumour of the liver, and of thus practically testing the value of a suggestion submitted on an earlier page. (See page 36.)

Sufficient time has not yet elapsed for the ultimate result of this procedure to be determined ; but we, nevertheless, think it better to bring the case under the notice of the Fellows.

A child, æt. 9½ years, evidently suffering from hydatid tumour of the liver, was admitted September 9th, 1870, into the Evelina Hospital for Sick Children, under the care of Dr. Playfair. The position and extent of the tumour are indicated in diagram No. 10.

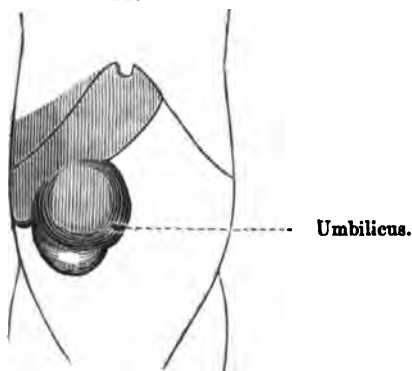
Dr. Playfair, having heard of the success of electrolysis in our hands, wished this operation to be performed in his case. However, on being told that we were anxious to make a trial of simple acupuncture, Dr. Playfair very kindly offered to perform this operation on his little patient. Of this offer we gladly availed ourselves. We here beg to express our sense of obligation to Dr. Playfair for his kindness, not only in performing the experiment, but also in permitting us to publish the details.

CASE 9.—*Hydatid cyst of considerable size growing from the under surface of the liver; simple acupuncture; progressive diminution in the size and tenseness of the tumour [termination of the case unknown.]*

(The notes of this case were taken by Mr. BESLEY THORNE, Registrar to the Evelina Hospital for Sick Children.)

Esther C—, æt. 9½, admitted into the Evelina Hospital, under the care of Dr. Playfair, September 9th, 1870, on account of an abdominal tumour, which had been first noticed about a year before. The position and outline of the tumour are, perhaps, best indicated by the accompanying diagram (fig. 10).

FIG. 10.



BEFORE OPERATION.

Its form was almost perfectly spherical, except that from its lower part a smaller mass projected downwards, which might be regarded either as a separate body or (with more probability) as a portion of the main tumour which had been subject to some accidental constricting force. The percussion note over the tumour was absolutely dull, and this dullness was continuous above with that of the liver. To the right of the tumour, above its centre, a sharp-edged elastic nodule could be felt, and made to slip beneath the finger, which gave one exactly the sensation of being the border of the liver, and was, no doubt, part of the right lobe of that organ. The border of the left lobe, on the other hand, could not be plainly felt, but a line of resistance could be traced upwards and to the left across the epigastrium, as is indicated in the diagram, and above this the percussion note was imperfectly resonant. The rounded tumour itself felt remarkably tense and hard, and distinct fluctuation could scarcely be detected in it, except towards its left edge close to the mesial line.

The child was well nourished and healthy looking. She complained of no pain, but it was stated that there had been some pain when the tumour was first discovered.

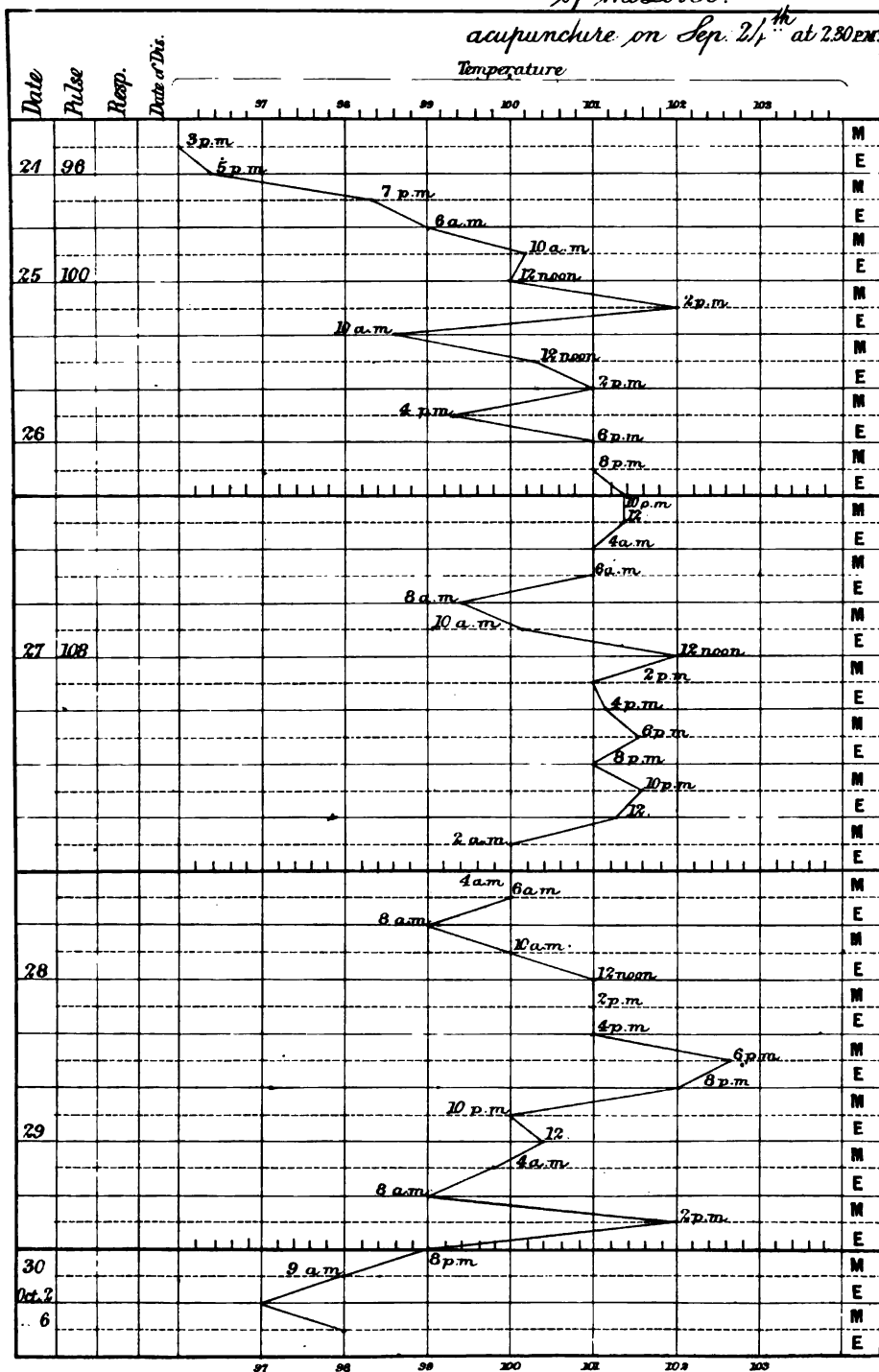
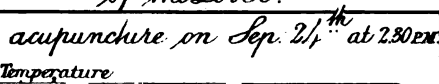
The circular measurement of the abdomen at the level of the umbilicus was twenty-three inches.

On September 24th, at about 2.30 p.m., in the presence of Dr. Fagge and Mr. Thorne, Dr. Playfair introduced two fine gilt needles into the interior of the tumour at two of its most prominent points, chloroform having previously been administered by Mr. Evans, house-surgeon to the hospital. The needles were found to be freely movable within the cyst, and could be rubbed together. They were left in for five minutes, when it was found that one of them had slipped out of the tumour. Both were then withdrawn.

On recovering from the chloroform the child made considerable expression of suffering, but this appeared to be due to apprehension rather than to actual pain, if not in great measure simulated. The abdomen immediately after the operation measured twenty-three inches round at the level of

Age 9 $\frac{3}{4}$

Disease. Hydatid humour
of the Liver.



the umbilicus. The tumour was considered by those present to be less tense and prominent than before.

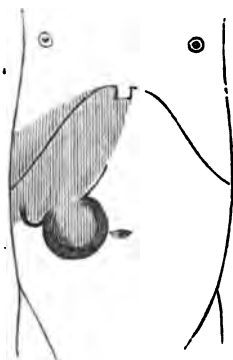
The temperature, which had previously been rather below than above the normal, began to rise soon after the operation, and by 2 p.m. on the following day had reached 102° . The next morning it was 98.6° , but it again rose, and fluctuations were noted for some days afterwards, the highest point observed being that of 102.6° at 6 p.m. on the 28th, the fourth day from the performance of electrolysis.

In other respects the child appeared to be nearly as well as usual.

The tumour underwent gradual but progressive diminution in size. The projection from the lower part of the tumour, which had to some suggested the idea of the existence of a second cyst, disappeared entirely. The tumour next ceased to be visible on inspection of the general abdominal surface, and could be detected only by manipulation of the abdomen, as a soft, rounded, readily movable mass. In this condition it remained when the child was last seen (November 1st).

No fluctuation was at any time discovered in the abdominal cavity.

FIG. 11.



TWO MONTHS AFTER OPERATION.

[P.S., June, 1871.—It has unfortunately been impossible to trace the subsequent progress of this case. The address given when the child was admitted into the Evelina Hospital was Wilfred Street, Spitalfields; but it appears that there is no street of that name; and in spite of repeated search in the neighbourhood I have hitherto failed to discover the child, whose surname is rather a common one.—C. H. F.]

A THIRD COMMUNICATION
ON THE
ENDEMIC HÆMATURIA OF THE SOUTH-
EASTERN COAST OF AFRICA.
WITH REMARKS ON THE
TOPICAL MEDICATION OF THE BLADDER.

BY
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Received June 28th.—Read November 22nd, 1870.

IN my previous papers I have described the general symptoms of this parasitic disease, and have given all the information respecting its cause which I was able to obtain up to the time of their publication.

Since I presented my last communication to the Society I have had almost daily opportunity throughout nearly a year of watching the progress of the disease, and am now enabled to give more precise information respecting certain features of this interesting malady.

My observations have reference, *first*, to the prostatic form of the disease and its treatment; and *secondly*, to the structure and development of the parasite.

1. *The prostatic form of parasitic hæmaturia.*—In the patient upon whom the following observations were made,

the disease was confined to the prostatic portion of the urethra, as was indicated, negatively, by the absence of vesical or renal disturbance; and positively by the following symptoms: an intermittent discharge, by the urethra, of venous blood never exceeding a teaspoonful, and always mixed with urine, recurring after variable intervals of from two to fourteen days, and continuing for several days in succession. Excepting a cloudiness of the urine from the presence of free mucus, which on settling formed a russet or drab-coloured fluffy deposit, the morbid appearances were confined to the last tablespoonful of urine. With this was discharged a variable amount of blood and the branched mucous or blood-clot casts of the burrows of the parasites so characteristic of the disease. The eggs were chiefly contained in these casts, but numbers were always to be found free in the urine. The secretion was always acid, and frequently deposited lozenges or spiculæ of uric acid. The blood usually, and most days exclusively, appeared in the urine voided after breakfast, the expulsive efforts of defæcation favouring both its flow and the discharge of the mucous casts. At later periods of the day the bladder was usually emptied without any appearance of blood; but if, after this was effected, the patient at any time used strong straining efforts for a few minutes, a teaspoonful of blood-stained urine, together with one or two little clots, were almost invariably ejected.

Apart from the passage of blood and the mucous strings or clots above described, and the annoyance—one day relieved and the next renewed—caused by these indications of the abiding of the parasite, there was no further inconvenience—no impediment to the flow of urine nor the slightest irritation of the genito-urinary apparatus, and the general health and activity were unimpaired.

Treatment.—Doubtful at first how high the urinary organs might be invaded, I confined my treatment for some months to the general use of henbane, turpentine, juniper, and iodide of potassium—remedies which are more or less completely eliminated by the kidneys and thus brought in contact with all parts of the urinary apparatus. Evident benefit resulted

from the use of these drugs, but at the end of six months I was satisfied that we were making no further progress in the eradication of the disease, for numbers of impregnated ova were still to be found in the urine. I therefore substituted local for general treatment. This consisted in the injection of various substances, in the form of solution or emulsion, into the bladder. The chief of these were iodide of potassium, quassia, wormwood and oil of male fern. As I am not aware of any observations on the topical medication of the bladder, I will offer a few remarks on the local use of each of these substances.

Wormwood (*Artemisia absinthium*), $\mathfrak{Z}\text{v}$ of a strong infusion of the dried plant ($\mathfrak{X}\text{j}$ to Oj of boiling water) were daily injected into the bladder every morning for ten days. It was retained for two, three, or four hours, and the urine when voided smelled strongly of wormwood. It was entirely without action either on the bladder or, as I soon discovered, on the free embryo of the parasite, which moved as actively and lived as long in the infusion as in water. I conclude, therefore, that this reputed vermifuge causes no annoyance to the adult Bilharzia.

Quassia.—I failed to obtain evidence as to the viability of the embryo in infusion of this wood. It was without local action on the bladder, nor did the prolonged use of the medicine appear to induce any constitutional effects. A little headache was occasionally complained of, but this was sufficiently explained by other causes. For many weeks $\mathfrak{Z}\text{v}$ of strong infusion ($\mathfrak{Z}\text{iv}$ — $\mathfrak{Z}\text{viij}$ to Oj of boiling water) were daily injected at a single operation.

Extract of male fern.—Judging from the rapid emetic or purgative action which invariably follows the ingestion of this medicine into the stomach, I proceeded cautiously, expecting that it might induce equally rapid and strong expulsive action of the bladder. I found, however, that I could inject sufficient of the extract to form a very nauseous emulsion with $\mathfrak{Z}\text{v}$ of water or infusion of wormwood without causing any great inconvenience. From 5 to 15 grains given in this way were, with a little effort, retained for two or even

three hours, but towards the end of this time the desire to relieve the bladder became irresistible, and the act was attended with strong expulsive efforts and followed by moderate spasmodic irritation for about an hour afterwards. The extract did not appear to be absorbed. The greater part certainly was rejected with the urine in the form of green spherules. That male fern directly affects the parasite injuriously, I have no positive evidence to show; but it acts most beneficially in exciting strong expulsive efforts whereby the ramified passages in the mucous membrane are to some extent at least cleared of the parasitic products.

Iodide of Potassium.—In a previous communication and in reference to the injection of styptics or direct irritants into the bladder, I expressed an opinion that topical treatment in this disease is out of the question, for the obvious reason that even supposing the body of the parasite lay bare upon the surface of the mucous membrane, the injection of this class of medicines would do more injury to the host than to the parasite. I therefore directed my attention to the soluble non-irritant salts with the hope of finding some which by readily permeating the mucous membrane would reach the crypts and tunnels in which the parasite lay, and which, while exerting an injurious action on the parasite would still be devoid of direct irritant action on the mucous membrane. I found iodide of potassium to possess these qualities. A solution containing five grains of the salt in the ounce fails to produce the least irritation when placed in the eye, but if a healthy leech be dropped into it, the animal immediately begins to writhe, the movements then become arrested, and death occurs in the course of an hour or so. If a leech be merely immersed in the solution for a few seconds, and then washed and placed in clean water, it remains motionless and sick for several days. Having determined thus much, I began by injecting the following every other morning:

R. Potassii iodidi, gr. x;

Infusi quassiae (3iv ad f. 3xx) 3v.

Solve et fiat injectio.

The iodide of potassium was gradually increased to gr. xxx,

and this treatment continued for two months, occasionally substituting an emulsion of extract of male fern for the iodide of potassium.

The iodine injection was usually retained for three hours, and on one or two occasions as long as five hours. The urine then voided showed the presence of iodine on using the proper tests. The salt was readily absorbed by the mucous membrane, and the catarrhal symptoms and iodine taste caused by these large doses of the salt were at first rather severe. The patient, however, became accustomed to them, and soon ceased to make complaints. The iodide of potassium never produced the least urethral or vesical irritation. This was the medicine upon which I chiefly relied.

The injection of the bladder was readily effected by means of an india-rubber bottle holding the fluid and attached to an elastic catheter with a terminal orifice. The only precaution needed was to prevent the catheter passing further than the membranous portion of the urethra, in order that the remedy should flow over the diseased part. This was of course prevented if the open point of the instrument slipped into the bladder, in which case the injection only came in contact with the urethra, when it was returned two or three hours afterwards diluted with the urine.

After a few lessons my patient was able to inject his bladder without assistance, and he has now returned to Natal with directions to use the following injections alternately every third day :

R Potassii iodidi, gr. xx ;

Aquæ tepidæ, ℥v.

Fiat injectio.

R Sodæ hyposulphitis, ℥j ;

Aquæ tepidæ, ℥v.

Fiat injectio.

Before leaving England, I washed out the bladder by means of a double channeled catheter. Owing to the morbid condition of the mucous membrane great care is needed in this operation, for if strong pressure be used upon the bag, the return current, by flowing forcibly against the mouths of the

passages, is apt to detach small fragments of the diseased and softened mucous membrane.

I have now to speak of *the results of this topical treatment*. The first effect of the injection was to bring away a great quantity of the branched mucous casts of the tunnels formed by the parasite with hosts of imbedded eggs. Some of these casts measured more than one fourth of an inch in diameter. After a few weeks the casts lost their solid cylindrical character, and were ultimately replaced by long skin-like membranes, destitute of structure, and only here and there thickened by the usual mucous corpuscles. These casts seemed to be formed by exudation from the walls of the emptied tunnels. They were almost destitute of ova, and some of them were three fourths of an inch long. At the same time free ova nearly disappeared from the urine. These tough membranous casts soon presented an appearance which I had not before noticed: here and there they entangled masses of round or more usually oval corpuscles of pretty equal size, faint in outline, of a smooth glistening appearance, and evidently composed of excessively fine molecules of fatty matter (fig. 12). These I take to be the excrementitious products of the adult parasites.

Attached to the membranous casts numbers of laminated corpuscles—the so-called colloid corpuscles—were occasionally observed, sometimes singly, sometimes in large groups. Fig. 11 represents such a group mixed with recent ova and dehiscent and collapsed egg cases. The corpuscles vary in size from that of a large mucous corpuscle to the $\frac{1}{36}$ th of an inch.

Under a high power the smaller resemble starch-granules, being brighter and having more defined outlines than the mucous corpuscles. To the naked eye the largest appear like minute grains of boiled tapioca, possessing a jelly-like transparency and a faint amber tinge. They are all more readily and deeply stained by carmine than the growing mucous corpuscles. Prolonged maceration in concentrated solution of caustic potash causes no change. After soaking for twenty-four hours in fuming nitric acid (sp. gr. 1.42), a bubble of gas about one fifth the volume of the corpuscle was evolved, the latter was a little swollen, the laminæ partly disturbed

and partly effaced, and the whole imbued with the yellow tinge characteristic of the action of strong nitric acid on an albuminous body.

There can be little doubt, I think, that these corpuscles were derived from the prostate. Amongst the various morbid products described I did not fail to obtain evidence of the death and disintegration of the adult parasite.

Fig. 13 represents the structure of some fragments washed out of the urethra or bladder. One of these fragments measured $3 \times 2\frac{1}{4}$ lines: they were all of a dead white colour, perfectly smooth on one surface, and slightly shreddy on the other. It is unfortunate that no description of the tissues of *Bilharzia hæmatobia* exists to enable me to identify these fragments, which must belong to the parasite affecting my patient. They are composed of coarse branching fibre cells (fig. 13a), closely interwoven to form a compact tissue (b).

Thus it appears conclusively that the topical treatment was effectual in clearing away the accumulated products of the parasite, in securing their expulsion as fast as they were formed, and ultimately in destroying the adult parasite.

But some of these are doubtless more securely concealed than others, and so escape for a time the effect of the remedies employed for their removal. At the time my patient left England he still passed a few eggs of the parasite; they were all, however, imbedded, not in masses of mucus, but in soft and recently formed blood clot. The ova, moreover, were in a more lively condition, and by placing the blood clot in water and using a little pressure, the embryo was readily liberated and its structure and movements observed.

Structure and development of the embryo.—In my first paper on the parasitic hæmaturia of the Cape of Good Hope, I pointed out the similarity of the parasitic products in the cases therein narrated, to the description and figures of the *Distomum hæmatobium* given by Bilharz and Griesinger, but there still remained sufficient differences to induce me at that time to refer the objects of my study to some other species, and I provisionally called the parasite *Bilharzia Capensis*. I confess that I have never had much doubt of the

identity of the North and South African parasite, still I can only deal with facts, and my position with regard to the question is pretty much the same as it was seven years ago. The difficulty lies on the one hand, in my cases, in the almost complete concealment of the adult parasite—for as yet I have only seen fragments of the animal; and on the other, in the imperfection and insufficiency of the published figures of *Distomum hæmatobium*, together with the fact that both Bilharz and Griesinger describe and figure *two* forms of egg, the one with a terminal and the other with a lateral spine. In all my own cases I can say positively that only one form of egg has existed, viz. that with a terminal spine. Variation in the size, length, and outline of the egg is often observable ('Medico-Chirurgical Trans.,' vol. xlvii, p. 60), but I have never seen any egg with even a tendency to the formation of a side spine.

I even doubt whether this peculiar form exists in *D. hæmatobium* itself. To my mind the objects represented¹ appear to be escaped embryo masses and not eggs. Griesinger himself speaks of them as eggs or cocoons. If these two talented observers yielded this point of difference in the ova of the Egyptian parasite, then I grant that I find no difference between *Distomum hæmatobium* and *Bilharzia Capensis*.

To return to facts. As it is of the greatest importance to the residents of infected districts that the parasite should be recognised in every phase of its development, I will now conclude my observations with a full description of the living embryo, and with a statement of certain facts respecting the earliest phases of its existence.

Fig. 1 represents the ripe egg ready to dehisce and set free a living embryo. The rupture is preceded by strong writhing and retractile movements chiefly of the anterior half of the body and active movement of the cilia clothing its surface. These continue until the egg case gives way, when the animalcule is liberated more or less readily, and then it at once commences very active natatory and vermicular movements according

¹ Fig. 2, p. 562, 'Archiv für physiologische Heilkunde,' vol. xiii, 1854, Griesinger. Fig. 213 b, p. 622, 'Die menschlichen Parasiten,' vol. i, Leuckart.

to circumstances. The former are very rapid and graceful. Assuming an elongated, elliptical, or more commonly a cylindrical form, the embryo advances itself by a rapid undulatory action of the cilia. When the animal is actively swimming, only those cilia which clothe the shoulder (fig. 9) are usually visible, and being stronger than the rest they form a beautiful circle, by the motion of which alone, as it appears, the movements of the embryo are directed. In its progress the animal assumes a variety of forms. It often retains the original elliptical shape (figs. 2, 3, and 4). Sometimes the anterior half of the body is contracted to vermiform proportions (fig. 5); sometimes only the posterior portion is thus affected (fig. 10). More rarely the body is doubled by a transversely median constriction (fig. 7). If the animalcule meet with an obstacle the anterior third of the body may be quickly retracted as far as the line of attachment of circle of stronger cilia (fig. 6); or the whole body is still further elongated and advanced by vermicular contractions through or by the opposing object.

I have many times succeeded in liberating simultaneously from the ripe ova as many as twenty embryos, and watched their varied movements in a drop of water under a half inch object glass.

No sight can convey either a more vivid impression of the activity of animal development, or a more complete realisation of the energy of parasitic life; but how much soever our interest is excited by the sight, its attractiveness is certainly not increased by the unavoidable reflection that the tissues and fluids of the body may readily become the prey of these invaders.

The viability of the embryo in respect of temperature is considerable. I have succeeded in hatching active embryos at 42° Fahr., and after they have been exposed in the urine to that temperature for twenty-four hours.

After swimming actively about for two or three hours under the covering glass on a microscopic slide, the motions of the embryo become gradually slower and then soon cease. But even in death the little animal retains its protean character.

One of the most remarkable of its forms is that represented in fig. 8, in which there is a distinct segmentation of the body, a character which is foreshadowed in the constrictions which affect the living embryos, and which no doubt determines the regularity of these. (Compare figs. 5, 6, 7, 8, 9, and 10.)

During the life of the embryo its organization is readily observed. The anterior view of the rostrum (fig. 3 *a*) presents a depression, at the bottom of which appears two little orifices; these communicate below, each with a delicate tube which terminates, about the junction of the anterior and middle thirds of the body, in an equally delicate globular or pyriform sac (figs. 1, 2, 3, 4, &c.). At the lower and internal part of this sac a minute rounded vesicle is occasionally visible (fig. 2): it is probably the indication of an opening into a further prolongation of the alimentary canal, which, if it exist, is lost to view amongst the granular spherules which are conspicuous in the posterior half of the body. Whether the posterior continuation of the alimentary canal forms a tubular network, as in the adult distomata, is therefore doubtful, but on watching the writhings of the embryo delineated in fig. 2, in its prolonged efforts to withdraw itself from the egg case the interspherular spaces were elongated so as to present the appearance of a network of the finest tubes. To the outside of each pyriform sac a second smaller one is occasionally observable; the space included between the pyriform sacs and their tubuli is occupied by a molecular mass which during the movements of the animal undergoes strong contractions. It is probably the retractor muscle by which the anterior extremity of the body is invaginated within the body (figs. 2 and 6). In fig. 4 there is an indication of a third tube: it is probably nothing more than a cordiform condition of the retractor muscle.

After the death of the embryo the parts above described are usually indistinguishable; the cilia are rarely visible, and the body appears to be made up of a homogeneous mass of granules (fig. 10). In water the integument is detached and raised by imbibition. This is represented in fig. 11 in which the rostral aperture appears to be relaxed and dilated.

One or two interesting questions as to the primary mode in which the parasite attaches itself to the body remain to be considered. *Firstly*, for example, "does the embryo become liberated as above described within the system?" The presence of groups of dehiscent egg cases in the urinary products seems at first sight a sufficient answer to this question. But it is remarkable that I have never observed the liberation of a living embryo from the egg when immersed in the urine, nor have I even met with a free living embryo in the urine. Eggs which split open and liberate active embryos immediately after they are placed in water, remain quiescent for an indefinite time when left in the urine, and all my attempts to hatch them in this fluid kept fresh and warm have invariably failed.

Again, the female appears to be incapable of receiving the disease from an infected male. The wife of one of my patients has three or four healthy young children, and the husband has been passing numbers of the eggs of the parasite every day of their married life. The lady has never had the slightest symptom of the parasitic disease, and the urine is free from all traces of the parasite. I conclude, therefore, that, if the parasites increase in the body from development of the eggs, this takes place in the nidus of solid mucus, in which they are for the most part imbedded, and that those which escape free into the urine are retarded in their development, and ultimately undergo destruction.

This conclusion is corroborated by the following experiments. Two young rabbits and two dogs were allowed to take at intervals with their food pellets of the mucus containing swarms of the eggs. Three of these animals were killed after an interval of two, three, and six months respectively, and carefully examined for Bilharzia. The dog had abundance both of *Tænia serrata* and *T. elliptica* in the intestines. Both rabbits had one or two small pyriform vesicles hanging from the omentum near its attachment to the stomach, and each of these vesicles contained a larval *tænia* (*Cysticercus*). In one of these animals I found numbers of the "*oviform bodies*" peculiar to this animal. They resemble the ova of

Ascaris lumbricoides in form and appearance, but are not one third the size, while the ova of *Bilharzia* are at least six times larger. The genito-urinary and biliary passages, and also the mesenteric and hepatic veins, of both the dog and rabbits were explored, but no trace of *Bilharzia* could be found.

I conclude from these observations, and from some other experiments which I need only allude to here, that, as a rule, *Bilharzia* is incapable of development within the animal body, the bare unprotected egg being the starting point.

This may, perhaps, be due to the retarded liberation of the embryo; for, *secondly*, the question still remains whether the liberated embryo is capable of maintaining its existence, and undergoing development into the adult sexual parasite within the body. I am strongly inclined to think that it may, and especially if it soon come into contact with a nourishing fluid such as the blood. At all events, this form of the parasite which so closely resembles some of the animalculæ found in the stagnant water of this country, should be carefully sought for in the water of the infected districts of Africa.

Lastly, as to the manner in which the animal gains access to the body. Is it by the mouth, by the urethra, or by the skin? My last patient, a colonist of Natal, made me acquainted with a fact which renders it possible that he, in common with many others, may have received the animal through the skin. He states that every colonist is attacked during the first year or two of his residence in the country with large indolent sores, which spread like a syphilitic ulcer and leave deep scars. He showed me two large, deep, white scars on his own body, one on the outside of each ankle.

It may be that the minute, leech-like animal fixes itself to the skin of the bather, and by means of an ovipositor implants the ova in some superficial vein, the operation being so delicately and quickly performed as scarcely to attract the notice of the individual. If such be the case, it is easy to understand that the hatching process and irritation attending the movements of the free embryos would result in an indolent form of ulceration, and that the little animals may be carried by the circulation from the ankle to the pelvis. A

careful microscopic examination of these sores from first to last would either throw considerable light on the origin of the endemic hæmaturia, or suffice to disprove the correctness of the above theory of infection. As we know nothing of the pathology of these endemic ulcers a careful account of them would, in any case, form a most acceptable contribution to pathology. (See note on endemic ulcers, Appendix.)

If such a mode of infection be possible, we may assume that it would be still more easily effected by the passage of the animal or its eggs through the mucous membrane of the stomach or rectum; and Bilharz has, indeed, associated the parasitic disease of the veins and dysentery in such a manner as implies cause and effect. In all my own cases, however, the mucous membrane has never, either by dysentery or the appearance of blood, shown the slightest trace of lesion; and hence we are led to account for a remarkable fact, viz. the localization of the disease in the genito-urinary organs. This *may* happen in the way I have just described, but it has always appeared to me *much more probable* that the animal, in one of its early forms, gets to this part of the body by the more direct route of the urethra.

The question of a general blood infection cannot be entertained, for the size both of the ovum and of the most attenuated forms of the ciliated embryo preclude its entrance into the smallest arteries or veins.

APPENDIX.

My friend, Dr. Symes Thompson, has told me more than once that a very intelligent medical man who has resided for a considerable time in the infected parts of S. Africa, disbelieves entirely in the existence of parasitism as a cause of endemic hæmaturia. This will in some measure explain that dearth of information on a matter of fact as plain as bloody urine itself, which has existed since the time I first made my investigations known.

It is satisfactory to me therefore to be able to adduce the following corroborative evidence from a gentleman who has

taken up the subject with the earnestness and ability requisite to clear up the gaps in our knowledge indicated in the foregoing paper. Dr. J. Vacy Lyle, of Durban, Natal, is the gentleman I refer to. I extract the following from his letter to me, dated August 25th, 1870:—

“I have for some time been engaged in collecting information on this curious disease, and have notes of a great number of cases occurring in both males and females—Europeans, Asiatics, and Kaffirs, neither of which races are free from the parasite. But the symptoms caused by it are much more severe in the effeminate Indian than in the more vigorous European and African.

“I have not yet met with a case in a resident in this town (where rain or well water is used). As far as my experience goes, the disease is confined to the rural population—to labourers, planters, hunters, and temporary residents in the country—people who are forced to use river water, or water from marshes or pools. Nor is the disease confined to a limited area, the whole coast line from the Umkomas to the Umvaloos, which flows into Delagoa Bay, nearly 300 miles in extent, is, I believe, within its influence.

“No fatal case of the endemic hæmaturia of South Africa has come to my knowledge; on the other hand, I am acquainted with more than one instance in which after a long time all the symptoms disappeared, and this without any treatment at all.¹ I write by this mail to ask a friend, who is now in London, to consult you about his daughter. I extract from my note-book the following notes respecting her:—

“Isabella G—, æt. 6½, resident in Durban, irritable, anæmic, losing flesh, passes blood in the urine; the blood is only observed in the last drops voided. Under the microscope ova of *Bilharzia* observed to be plentiful. The child

¹ On this point see my first paper, ‘Medico-Chir. Trans.’ vol. xlvii, p. 65–7. The hæmaturia, indeed, ceases, but the parasite remains probably as long as life continues, and causes a new set of symptoms in some cases at least. As late as February 20th, 1871, Mr. Dunsterville, of Port Elizabeth, wrote me as follows:—“The elder of the two patients (Mr. G. D—) occasionally, nay rather

has been accustomed to visit Isabella's estate on the Umhlanga river, and whilst there to drink its water, and bathe in it.

"I regret to say our patient"—the subject of the present paper—"is not very attentive. He came once for examination since returning from England; I then found ova still existing in his urine, but few in number. His health was otherwise perfect."

Note on endemic ulcers.—The pathology of Delhi boil, which may be taken as the type of the various endemic ulcers, has lately received the attention of Staff Surgeon-Major Alexander Smith and Staff Assistant Surgeon J. Fleming (see the 'Army Medical Department Reports,' vols. x and xi). The former of these gentlemen has figured "egg-like bodies," which abound in the open sores left by the boils; Dr. Aitken, who has examined them, thinks them "quite in keeping with the extremely varied forms in which *distoma* are found in the bodies of man and animals" (vol. x, p. 834).

Dr. Fleming's figures remind one strongly of concentric growths of connective tissue, and in his last communication he appears to have resolved the objects which he formerly supposed were ova of parasites into growths of the areolar tissue (vol. xi, p. 513).

frequently, suffers from the passage of renal calculi. I enclose you some. The largest were passed after two days of suffering about a year ago, the smaller appeared at frequent intervals." It is now ten years at least since the hæmaturia disappeared in this case, and yet the eggs of the parasite occur in these calculi.

DESCRIPTION OF PLATE I.

FIG. 1.—The ripe egg, containing the ciliated embryo. $\times 400$.

FIG. 2.—Embryo escaping from the egg shell. $\times 350$.

FIGS. 3, 4, 5, 6, 7.—Various forms assumed by the same embryo. $\times 270$.

FIG. 8.—Dead embryo, showing a regular tripartite segmentation of the body. $\times 300$.

FIG. 9.—Living embryo, cylindrical form, with a similar foreshadowing of segmentation. $\times 300$. The more distinct play of the cilia around the shoulder of the animalcule is represented in this figure, as also in Figs. 5 and 6.

FIG. 10.—Dead embryo, in which the posterior part of the body is contracted. $\times 270$.

FIG. 10 bis.—Another dead embryo, in which the ciliated integument is raised by the imbibition of water, and the stomatic aperture is relaxed. $\times 270$.

FIG. 11.—A group of laminated or colloid corpuscles of various forms and sizes, mixed with eggs and old dehiscent egg cases.

a. The smallest. One of the larger is fractured, displaying the nucleus.

b. Mucus corpuscles, in which the whole of the objects delineated in Fig. 11 were imbedded; a few only are represented, in order to show the relative size of the mucus and smallest colloid corpuscles.

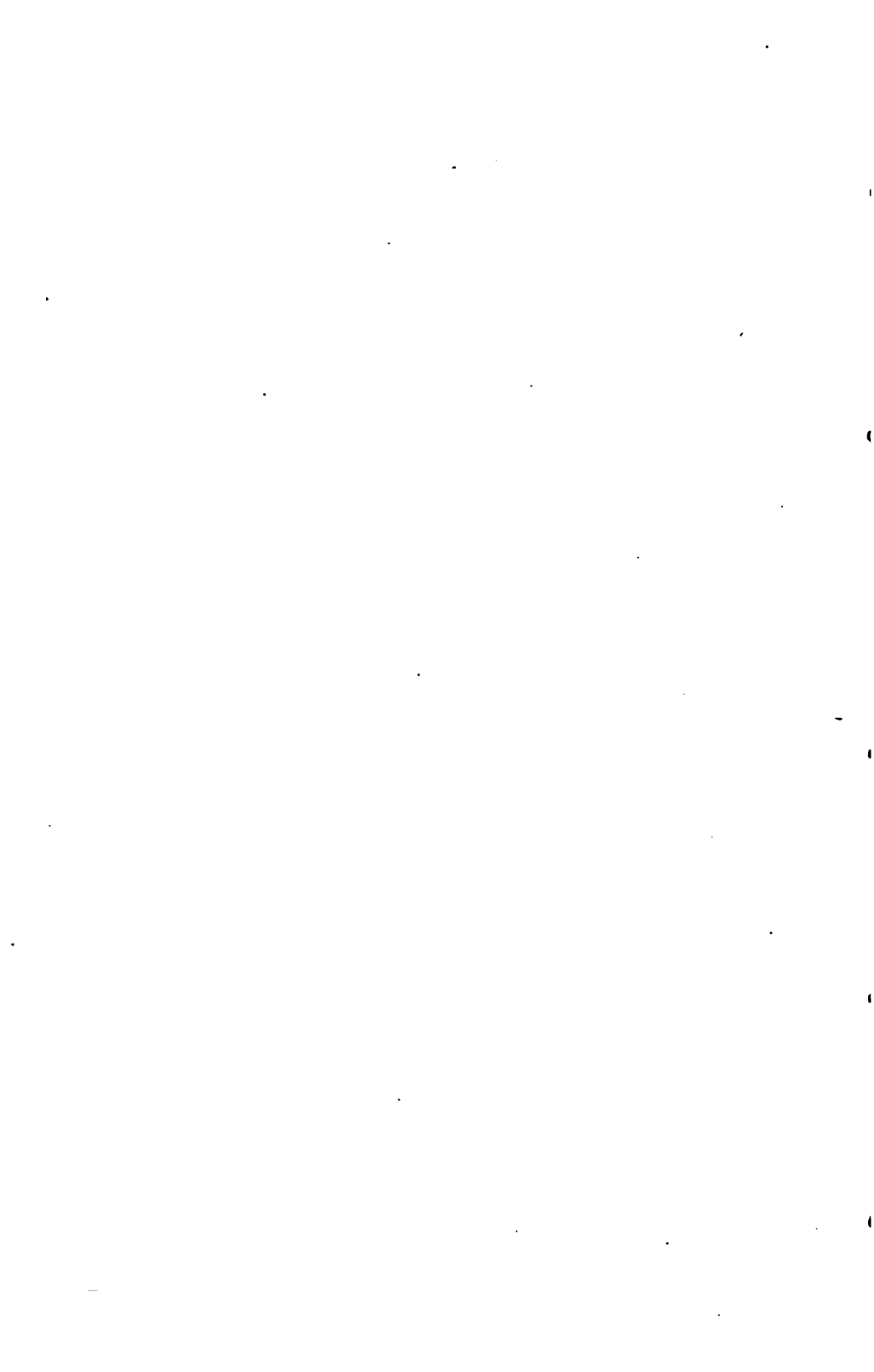
c. Recent ova.

d. Dehiscent and collapsed old egg cases. All $\times 100$.

FIG. 12.—Delicate molecular fatty corpuscles imbedded in membranous and stringy mucous exuviations, with mucus corpuscles adherent.

FIG. 13.—Areolar tissue, composed of—

a Large fibre cells. This is probably a portion of the integument of the adult parasite.



ON

TEMPORARY GLYCOSURIA AS A
SEQUEL TO CHOLERA.

BY

WILLIAM SEDGWICK, M.B.C.S.

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THE occurrence of choleraic glycosuria has attracted very little notice in this country, although abroad it has received, especially during the last epidemic of cholera, much clinical attention. As yet, however, scarcely any attempt has been made, even by those who have specially studied the subject, to give a physiological explanation of its occurrence during convalescence from this disease, when, apart from any chemical analysis of the urine, it may be observed that a condition of temporary diuresis usually succeeds to a previously more or less complete suppression of the urinary secretion.

The probable discovery of sugar in the urine of cholera patients was, so to speak, foreseen by Reynoso,¹ and he sug-

¹ 'Comptes Rendus Hebd. des Séances de l'Acad. des Sciences,' tom. xxxiii, 1851, p. 606.

gested that it would be desirable for physicians engaged in the study of this disease to seek for sugar in the urine. There was no opportunity of testing the correctness of Reynoso's inference till the occurrence of the epidemic of cholera in 1854-1855, when, as stated by Buhl and Voit,¹ sugar was first distinctly recognised in the urine of cholera patients by Heintz and Samoje, and subsequently Voit himself also found it in two cases of cholera during that epidemic, in no trifling quantity. These observations were confirmed by other observers, and especially by Frederick Lehmann,² who found sugar in some of the forty-eight severe cases of cholera, occurring during the same epidemic, in which he examined the urine; the sugar, according to this observer, being limited to severe cases and never being found later than the third day after return of the urinary secretion. The discovery seems to have attracted at the time scarcely any attention, except among a few Continental observers, and it was almost, if not altogether, overlooked in this country; for Dr. Parkes, in his work 'On the Urine,' published in 1860 (p. 307), states, on the authority of Heintz, Samoje, and Buhl, without reference to any English observer, that in cases of cholera "sugar is occasionally present, sometimes in large quantities, in the first and second day's urine." It was not, indeed, till the epidemic in 1866 that the occurrence of glycosuria as a sequel of cholera can be said to have attracted much attention, and it must be admitted that the information hitherto received on this subject has been derived chiefly from the labours of the medical profession abroad, among which it may be useful to notice the observations of M. Gubler,³ and his pupil M. Bordier,⁴ at the Beaujon Hospital, Paris; of M. Langronne,⁵ aided by M. Bonnefon, at the

¹ 'Zeitsch. für rationn. Medizin,' Neue Folge, vi, p. 25, 1855; cited by Huppert, "Ueber die Glycosurie bei Cholera, &c.," 'Archiv der Heilkunde,' 1867.

² 'Physik. u. Chem. Studien ueber die Cholera,' Inaug. Diss. Zurich, 1857.

³ "Sur la Glycosurie Symptomatique dans la période réactionnelle du Choléra," 'Gas. des Hôpitaux,' 1866, pp. 410, 411.

⁴ 'Archives Générales de Médecine, Février,' 1867, pp. 176—193.

⁵ "Du Choléra Epidémique," Thèse de Paris, 1866.

Lariboisière Hospital, Paris; of M. Lorain,¹ at the Hôpital St.-Antoine, Paris; of M. Desnos² and his colleague M. Gombault,³ at the Hôpital de Ménages, Paris; the facts collected by this last-named observer being based on 1700 observations. To these may be added the observations of Dr. P. Treibmann⁴ during the epidemic at Leipsic in 1866, both at the cholera station of the Jacob's Hospital and also in the cholera lazaretto which was conducted by himself; and, lastly, the researches of Dr. H. Hüppert⁵ during the same epidemic of the disease. Whilst materials for the study of this temporary condition of the urine in cholera have been thus somewhat extensively collected by several able observers abroad, it is necessary to state that almost without exception the best and most distinguished writers on the disease in this country have not even alluded to the occurrence of sugar in the urine, although, as Bouchardat remarks, England is said to be the privileged land of glycosuria. This omission is very noticeable in the ninth report of Mr. Simon, under whose direction cholera was clinically and chemically investigated with much care and skill by Drs. Sutton and Thudichum in 1866. For although, in common with many previous observers, and especially with some of those who watched the first epidemic of the disease in 1832⁶, Dr. Sutton noted the occurrence of choleraic diuresis; yet it does not appear that sugar was in any of his cases suspected to be present; whilst in the report on the elaborate analysis of the urine in cholera by Dr. Thudichum there is no reference to sugar having been sought for on any occa-

¹ 'Études de Médecine Clinique et de Physiologie Pathologique—Le Choléra observé à l'Hôpital Saint-Antoine,' Paris, 1868.

² 'Nouveau Dict. de Méd. et de Chir. Prat.,' tom. vii, 1867, art. "Choléra Asiatique."

³ Unpublished memoir cited by M. Desnos.

⁴ Hüppert, loc. cit., 1867.

⁵ Loc. cit., 1867.

⁶ Dr. Lawrie, 'Glasgow Medical Journal,' vol. v, 1832, p. 329; and Dr. Andrew Buchanan, 'Observations on Malignant Cholera,' 1848, pp. 11 and 17—18 (reprint of a paper brought before the Medical Society of Glasgow in November, 1832).

sion, the researches of the last-named observer in this direction having stopped short at the detection of urocyanine, which occurs in the urine during what may, to some extent, be regarded as the preliminary stage of cholera convalescence.

In studying the character of the urine in cases of cholera attention should, in the first instance, be directed to the fact that the first and albuminous urine passed or withdrawn after the usually prolonged suppression of the secretion is, as a rule, deficient in urea and free from sugar; and that the subsequent condition of temporary glycosuria is preceded by the occurrence of a blue colouring matter, which appears to be intimately associated with saccharine transformation. This colouring matter, which is developed by nitric and by hydrochloric acids, and also by simple exposure to the air, in the urine of cholera patients previous to the stage of convalescence, and which has been variously referred to as indigo-blue, indigose, choleraic urocyanine, urocyanose, uroglaucine, cyanurine, &c., was detected in the urine of cholera patients during the epidemic of 1849, by Dr. Parkes,¹ who observed that it was generally developed in large quantity when nitric acid was added to the first urine passed after the cold stage, and also in that drawn from the bladder during the cold stage itself in a case of cholera in which there was no further secretion of urine. The fluid obtained by Dr. Parkes on this last occasion contained, we are informed, "albumen, but no urea; and gave, with nitric acid, a deep violet colour, passing into a blackish purple." Its chief importance in the present inquiry is due to the fact that it is very closely associated with the development of glycosuria, and that the occurrence of sugar in the urine in these cases appears to be simply a somewhat later stage in the series of pathological changes, which, so far as they affect the urinary secretion, admit of being referred to one common origin.

Before attempting, however, to trace the source whence the sugar is derived it will be useful to study the character

¹ 'The Monthly Journal of Medical Science,' vol. ix, October, 1849, pp. 1127—1130.

of the glycosuria which has been observed during convalescence from cholera, together with the various physiological, pathological, and artificially produced states of the system in which sugar may, as in cholera, be present in the urine, without giving rise to confirmed diabetes. For temporary glycosuria, like the previous suppression of urine, has no claim to be regarded as an exceptional phenomenon which is in any way characteristic of this disease; but, on the contrary, it will be found to occur during convalescence from other forms of acute disease, in which it is often associated with the previous development of a blue-colouring principle in the urine; it will be found also to occur, apart from disease, as a physiological condition during certain stages of development and at certain epochs of life; and it will be found, finally, that it admits of being experimentally produced.

Observers have differed, and in some respects very greatly, both with respect to the constancy with which glycosuria occurs, and the importance which should be assigned to this condition of the urine as a sequel of cholera. For whilst some have looked upon it as if it were simply an accidental occurrence and liable therefore to be occasionally, if not frequently, absent, others have been induced to regard the presence of sugar in the urine as an important symptom in the disease. M. Gubler,¹ who has specially studied the subject and who has described glycosuria as "symptomatic in the reactional period of cholera," states that, "in the period of algidity and cyanosis, the urine carries away only albumen and indigose, analogue of the blue of aniline. In an intermediate stage proteic matters may be seen to coexist with the saccharine substance. Finally, in confirmed and advanced reaction sugar passes alone in the urinary secretion," and the sugar thus passed may, we are informed, amount to many grammes per litre of urine. M. Jaccoud² has remarked that "cholera is a frequent cause of passing

¹ 'Gazette des Hôpitaux,' 1866, pp. 410—411.

² 'Nouveau Dict. de Méd. et de Chir. Prat.,' art. "Diabète Sucré," tom. xi, 1869, p. 816.

melituria." M. Lorain,¹ who regards sugar in the urine as a customary phenomenon "in a typical case of cholera," states that its appearance is transient and its amount inconsiderable. M. Desnos² in like manner refers to choleraic glycosuria as a transitory phenomenon developed in proportion to the diminution of the quantity of albumen in the urine; and he cites a passage from the unpublished memoir of M. Gombault, who has gathered a vast amount of information respecting the convalescence of cholera, from which it appears that in a large number of cases there is, during cholera convalescence, a polyuria out of proportion with the quantity of drink taken, that sugar is present in the urine on such occasions in somewhat considerable abundance, and that it may sometimes continue to occur for a fortnight.

Coincidentally with this occurrence of sugar in the urine the amount of urea is considerably increased. According to the observations of M. Bordier³ at the Beaujon Hospital during the epidemic of 1866, which essentially agree with those of other able observers, glycosuria was "a constant phenomenon in the reaction of cholera," and during reaction the amount of urea (analysis made by Dr. Chalvet) was found to be 48 per 1000, or more than double the normal quantity. The increase of this important constituent is the more noticeable from the fact that the albuminous urine which is first passed after a previously more or less prolonged suppression of the secretion in cases of cholera is deficient in urea, and that diminution in the amount of albumen is succeeded by increase in the amount of urea, so that as reaction advances towards convalescence, the albumen, according to the observations of Dr. Parkes,⁴ gradually decreases in quantity and "has, in fact, a course almost inversely that of urea." The well-marked increase of urea which subsequently characterises the urine when, during the progress of cholera convalescence, albumen is not unfrequently replaced by sugar, accords with

¹ Op. cit., 1868, p. 41.

² Loc. cit., 1867, pp. 418 and 426.

³ Loc. cit., 1867.

⁴ Op. cit., 1860, p. 306.

what has been usually observed in cases of confirmed diabetes, in which a permanently saccharine condition of the urine is in like manner associated with an excess of urea : the excess in these cases, as in those of the temporary glycosuria of cholera, sometimes extending to double the normal standard.¹

This occurrence of a large excess of urea in the saccharine urine of confirmed diabetes is associated with a reduction of temperature which is not essentially due to the disease ; for, neither the glycosuria itself nor the relative amount of sugar in the urine can in any way be directly connected with the development of animal heat. In like manner the occurrence of sugar in the urine of cholera patients does not appear to be directly dependent on any change of bodily temperature, for no sugar is found, as a rule, during the algide stage of the disease, nor during the advanced stage of consecutive fever, and no direct connection has been traced between either the previous depression or the previous elevation of temperature in such cases and the subsequent amount of sugar in the urine. This fully accords with the observations of Dr. Balthazar Foster² in cases of confirmed diabetes in which, although the temperature in such patients is on an average reduced 1 to 3 degrees, yet it was found "that the variation in the quantity of sugar passed in the twenty-four hours is not proportional to the rise or fall of the temperature of the body ;" the same temperature having been observed to coincide with widely different quantities of sugar. And it is in accordance also with what might reasonably be expected to occur, for it would be inconsistent with the fact of an increased amount of urea being usually coexistent with the sugar to suppose that there is any direct connection between the glycosuria and the loss of animal heat.

In this brief retrospect of the pathology of the urine in cholera, the chief facts to which attention should be directed,

¹ Dr. Thudichum, 'Appendix to the Eleventh Report of the Medical Officer of the Privy Council,' 1869, p. 130.

² "Note on the Temperature in Diabetes," Humphry and Turner's 'Journal of Anatomy and Physiology,' May, 1869, pp. 377, 378.

with reference to the occurrence of glycosuria, are the suppression of the urinary secretion as a primary result of the disease, with arrested formation of urea; albuminuria with deficiency of urea; the presence of a blue-colouring principle; and, finally, diuresis with excess of urea and sugar in place of albumen. In the sequence of phenomena here indicated urea, as the essential principle of the urine, necessarily occupies the chief position, and the subsequent presence of sugar, during the stage of convalescence, when albumen is no longer present in the urine, suggests that the temporary glycosuria of cholera may be due rather to the progress of reparation than of destruction, and that it is, as it were, the result of an excess of restorative effort on the part of the system to repair loss from previous disease. This suggestion derives support from what occurs in diabetic patients during an attack of fever, when sugar in their urine is apt to be replaced by albumen, and by what occurs in the same class of patients during the last agony, when a similarly retrograde course, with respect to the pathology of the urine is pursued, for in them also the urine becomes albuminous and the sugar disappears; and it is moreover supported by a large amount of collateral evidence which, in the course of the inquiry, will be found to be almost conclusive in its favour.

It would be unnecessary and, indeed, altogether beyond the proposed limits of this paper to enter into any discussion respecting the comparative merit of the several theories which have been advanced to account for the saccharine transformation which precedes the appearance of sugar in the urine. But it is allowable to state that in attempting to explain the temporary glycosuria which occurs as a sequel to cholera, much assistance has been derived from M. Jaccoud's modification of the well-known theory of M. Schiff, and that this modified theory seems to accord best with the facts hitherto observed.¹

¹ With respect to the discovery, if such discovery has been made, of the true principle of glycogenesis, it is interesting to find that on this as on other similar occasions no one is, strictly speaking, entitled to claim any exclusive

In the theory advanced by M. Schiff¹ to account for the occurrence of sugar in the urine it had been assumed that the liver is the passive centre of diabetes, and that when this organ, charged with glycogenic matter, receives, in place of normal blood, blood charged with diastatic ferment, it becomes passively impregnated with sugar, which is carried away in the general circulation and in the urine. The modification of this theory proposed by M. Jaccoud,² and which enables us to account for much which apparently could not otherwise be satisfactorily explained, is founded on an objection to restrict the process of saccharine transformation to the liver; for glycosuria being essentially, a disorder of nutrition, M. Jaccoud not unjustly thinks that it would be unreasonable to limit the process to one organ or tissue; and he therefore argues that "as glycogenic matter and ferment suffice to make sugar, it is very evident that the formation of sugar should take place wherever these two conditions shall be realised, that is to say, wherever the ferment of the blood shall encounter glycogen." There would consequently be a parallelism between the formation of carbonic acid, urea, and sugar, which is obviously in favour of this theory. For in the same way that the formation of carbonic acid, instead of

merit. For even the modification of M. Schiff's theory by M. Jaccoud, referred to above, is simply a reproduction of the theory, unsupported at the time by sufficiently satisfactory evidence in its favour, which was promulgated by Carl Schmidt, of Dorpat, in 1850 ('Charakteristik der Epidemischen Cholera, &c.,' Leipzig and Milan); and which, soon after its publication, was cited and condemned by M. Claude Bernard ('Leçons de Physiologie Expérimentale,' tom. 1, 1855, pp. 444—447). Unconscious of the connection, which has since been established, between glycosuria and cholera, Carl Schmidt appended to his work on the epidemic disease a short notice of diabetes, in which he urged that as both sugar and urea are diffused in the blood of all parts of the body, they have no definite source which can be localised in any special organ, but that these two products are formed everywhere, in consequence of the molecular changes which take place in the blood; and he moreover entertained the opinion that in the course of these changes fat may give rise to sugar.

¹ "Nouvelles Recherches sur la Glycogenie Animale," 'Journal de l'Anatomie et de la Physiologie,' 1866, pp. 354—382.

² "Leçons de Clinique Médicale faites à l'Hôpital de la Charité," 1867, pp. 826—828.

being limited, as was formerly supposed, to the lungs, is now admitted to take place in any part of the system where oxygen has been brought into contact with carbon; and urea, in like manner, having been formed in the general system, is simply eliminated by the kidneys; so the formation of sugar, instead of being restricted, as was at one time thought to be the case, to the liver, may equally take place wherever the materials requisite for such transformation are brought together. Both M. Jaccoud and M. Schiff agree in referring this saccharine transformation to a pathological change, which is essentially dependent on "repose of the blood," or "cessation of its normal movement;" and they are both also of opinion that it is in consequence of this arrest, or "partial or general slackening of the blood," that "experimental lesions of the nervous system lead to glycosuria." It may at the same time be remarked that this modified theory is consistent with the celebrated discovery of Dr. Pavy, which was communicated to the Royal Society in 1858, and which has since been confirmed by many skilful observers, including McDonnell, Meissner, Jæger, Herzen, and Schiff, and fully accepted by M. Jaccoud himself, that the production of sugar in the liver is a *post-mortem* phenomenon. Moreover, the results which have been obtained from clinical observation admit of being most readily accounted for by the modified theory referred to above. For a careful consideration of the conditions which have been observed to favour the development of glycosuria will be found to be in accordance with the supposition that sugar in the urine is consequent on a previous stagnation of blood; and that the cases in which glycosuria may be traced more or less directly to some affection of the alimentary canal admit of being fully accounted for on the same supposition, since the alimentary canal is primarily the source or centre whence the blood or nutritive fluid of the body is supplied. There is no need to assume that the previous stagnation which occurs in these cases involves even temporarily a complete arrest, either general or local, of the circulation, although there are cases in which sugar in the urine has apparently been the result of such a limited arrest

of blood as has been sufficient to cause local death. In cases, for example, of temporary glycosuria consequent on carbuncle, the occurrence of sugar in the urine seems to be the result, not simply of impaired or diminished circulation, but of such a complete arrest of blood as leads to the death of the part affected, a good illustration of which has been published by MM. Philipeaux and Vulpian.¹

Much assistance has been derived in the present inquiry from an examination of the various conditions of the system both in health and in disease during which, apart from cholera, glycosuria is liable to be temporarily developed. For some time it has been known that sugar is physiologically a usual constituent of the urine in certain states of the system and at certain epochs of development, as for example, during lactation, the earlier stages of fœtal development, and occasionally also at very advanced periods of life; whilst among those conditions, in which it may pathologically be regarded as a frequent constituent of the urine, are malarious diseases, both intermittent and remittent; the period of convalescence from many acute forms of disease; local arrests of the circulation, such as occur in carbuncle, gangrene, and tubercle; and injuries and diseases of certain parts of the nervous system, the effects of which have often formed the subject of investigation in experimental physiology.

With reference to the occurrence of sugar in the urine during what may be broadly defined as the period of milk formation in women, it may be remarked that although women are usually far less liable than men to suffer from diabetes, yet there is a remarkable exception to this influence of sex in the case of women in the puerperal state, which, taken in connection with what has been observed respecting the continuance of the mammary secretion when the urine is suppressed in choleraic collapse (a condition which has been referred to antagonism between the nutritive and reproductive functions), will be of much use in the present inquiry.

¹ "Note sur un cas de diabète passager survenu pendant le cours du développement d'un anthrax," 'Gazette Hebdomadaire,' tom. viii, 1861, pp. 782—784.

The occurrence of puerperal glycosuria is essentially connected with, and dependent on, the continuance of the lacteal secretion, and it consequently suggests a satisfactory explanation of the presence of sugar in the urine during convalescence from cholera. It was announced by M. Blot,¹ in a communication to the French Academy of Sciences, in 1856, that sugar exists in the urine of all lying-in women, of all suckling women, and in about half the number of pregnant women; the occurrence of sugar in all these cases being essentially connected with the development of the lacteal secretion. In one of the cases recorded by M. Blot (who was assisted in the chemical part of his researches by MM. Reveil and Bertholet), in which a woman had continued to suckle her infant for twenty-two months, he found 8 grammes of sugar in 1000 grammes of urine, whilst, on the contrary, he found that when lactation ceases, the sugar disappears from the urine, "more quickly in women who do not suckle, more slowly in those who, after having suckled, begin to wean." The correctness of his observations was for a time contested, but their accuracy has been fully demonstrated by subsequent inquirers, among whom may be cited M. Lecoq,²

¹ "De la Glycosurie Physiologique chez les femmes en couches, les nourrices, et un certain nombre de femmes enceintes." 'Comptes Rendus de l'Académie des Sciences,' tom. xliii, 1856, pp. 676—678.

Sugar had been detected, previous to M. Blot's observations, in the urine of a puerperal woman on the fifth day after delivery by Lehmann ('Jahresb. d. Physiol. ch.,' 1844, s. 27), in which case the secretion of milk having been suddenly suspended, the sugar only appeared in the urine for four days. The coincidence of lactation and glycosuria had also been referred to by M. Bouchardat ('Répertoire de Pharmacie,' tom. 6, p. 178, and 'Mémoires de l'Académie Nationale de Médecine,' tom. 16, 1852, pp. 69—212), who had specially recorded two cases of puerperal glycosuria, one of them being the case of a healthy young woman, whom he attended conjointly with M. Roche, and in whom during lactation, characterised by a superabundance of milk, temporary glycosuria was developed to so great an extent that the patient passed seven litres of urine containing seven hundred grammes of glucose in the twenty-four hours. Whilst Prof. René (cited by M. Emile Barbier, 'Le Diabète Sucré, Thèse-Montpellier,' 1856, p. 16) had established "the existence of saccharine diabetes in some women arrived at the last period of pregnancy."

² 'Gazette Hebdomadaire,' tom. x, 1863, pp. 35—39.

who has specially noticed, with respect to the glycosuria of pregnant women, that the quantity of sugar increased towards the end of their pregnancy, when milk begins to be present in the breast, and that sugar is constantly present in the urine during lactation; whilst M. Becquerel,¹ having examined the urine of nine women recently delivered and suckling their infants, has recognised that the facts announced by M. Blot are perfectly correct. The occurrence of this temporary glycosuria in the puerperal state is the more remarkable from the fact that women attacked with true diabetes very rarely become pregnant; whilst, on the other hand, lactation especially when too long continued, appears to be a cause, not only of glycosuria as a temporary phenomenon, but of confirmed saccharine diabetes, three such cases having, for example, occurred in the practice of M. Bouchardat.² The dependence of temporary glycosuria in these cases on a nutrient drain from the system during the puerperal state is well illustrated by a case recorded by Dr. Bennewitz in Osann's 'Clinical Report' for 1823-4-5,³ in which glycosuria was exceptionally developed at a very early period of at least three successive pregnancies, independently of the formation of milk, in consequence of the continuance of a menstrual flux.

There can be no difficulty in perceiving that, owing to the apparent antagonism which prevails between nutrition and reproduction, what has been already suggested to account for the occurrence of puerperal glycosuria is equally applicable to cases of cholera, in which a central arrest of nutrition seems to permit of the continuance, and, as regards lactation, sometimes even of an increase of the functions associated with reproduction, and in which also glycosuria is commonly observed among the sequelæ of the disease, following albuminuria, and apparently preceding the complete re-establishment

¹ 'Bulletin de la Société Médicale des Hôpitaux de Paris,' tom. iii, 1864, pp. 368—369.

² 'Revue des Cours Scient.,' January 9th, 1869, p. 92.

³ Cited in 'Edinburgh Medical and Surgical Journal,' vol. xxx, 1828, pp. 217, 218.

of the nutritive functions. The aid which has been derived from these cases of puerperal glycosuria should moreover lead us to expect that in extending still further the limits of the inquiry by studying the conditions which have been found in other cases and on other occasions to favour or oppose the temporary occurrence of sugar in the urine, we may succeed in obtaining a clearer insight into the nature of this peculiar state of the system. In pursuance therefore of the inquiry in this direction it will be useful to bestow attention on the rarity of the occurrence of glycosuria in infancy, and its comparative frequency in old age; the contrast presented during these two periods being the more remarkable from the fact that at the extreme limits of life there is, as regards the occurrence of sugar in the urine, an inverse relation between the influence of age and the influence of diet, which is opposed to what has been observed respecting the relation of glycosuria to diet during mature life. For the amount of sugar and of sugar-forming material usually contained in the food of infants would, if taken at a later period of life, be capable, at least to some extent, of aiding in the development of glycosuria, and even during lactation, when the mother herself is temporarily diabetic, the urine of the infant which she suckles is free from sugar. Whilst in old age, although the diet is then relatively deficient in saccharine matter, the urine is often found to contain sugar.¹

This temporary glycosuria of the puerperal state, of old age, and of foetal existence, is, strictly speaking, a physiological phenomenon independent of any pathological change in the system, which may, it is true, in some cases be associated with the passage of sugar in the urine, but which may also in other cases intervene to prevent it. In the glycosuria, for example, of suckling women it has been observed that when their health is impaired by disease, sugar sometimes ceases to

¹ Dr. A. Dechambre, "Sur la présence habituelle du sucre dans l'urine des vieillards," 'Gazette Médicale de Paris,' 1852, pp. 220—222; Dr. Bence Jones "On the frequency of Diabetes in Old Age," 'Med.-Chir. Trans.,' vol. xxxvi, 1853, pp. 420 *et seq.*; and Dr. Roberts, 'A Practical Treatise on Urinary and Renal Diseases,' 1865, p. 206.

be passed. The continuance of puerperal glycosuria would therefore have to be regarded as a normal condition, whilst its cessation would be an indication of some abnormal change. Now there is a fact of much significance from its connection with the glycosuria of cholera, to which special attention has lately been directed by M. Burdel,¹ respecting the recurrence, through the influence of intermittent fever, of sugar in the urine of suckling women in whom it had been for a time pathologically suppressed; and he has also directed attention to the very exceptional occurrence, through the same morbid influence of sugar in the urine of infants at the breast. The ordinary occurrence of glycosuria as a result of intermittent or marsh fever, to which M. Claude Bernard, in a communication addressed some time since to the French Academy, directed attention as a new fact, had been noticed many years previously by Dr. Prout,² who, in referring to the connection between saccharine mal-assimilation and malaria, stated that although "diabetes can be hardly pronounced a malarious disease, yet he had seen many cases of diabetes from malarious districts." But it is chiefly to M. Burdell that we are indebted for definite information on this subject, and he has succeeded in showing the extent to which sugar in the urine is liable to occur in the various forms of malarious disease, the greatest quantity being present in cases of the pernicious fever or ague of Algeria. Such observations are interesting and to some extent important from the analogy which can be traced in other directions between the graver manifestations of ague and cholera, of which the culminating point in both, so far as regards the renal secretion, is the complete and prolonged suppression of urine.³

With regard to the occurrence of temporary glycosuria as a result of previous disease, it is instructive to notice that in

¹ "Mémoire sur la Glycosurie dans les Fièvres paludéennes," *L'Union Médicale*, 1859, tom. iv, p. 389.

² 'On the Nature and Treatment of Stomach and Renal Diseases,' 5th edit., 1848, p. 19.

³ Haspel, 'Maladies de l'Algérie,' tom. ii, pp. 292—293; cited by Dr. John Macpherson, 'Cholera in its Home,' 1866, p. 66.

the large group of cases lately referred to in the paper "On some Analogies of Cholera in which Suppression of Urine is not accompanied by symptoms of Uræmic Poisoning,"¹ there is, as regards the urine, essentially the same sequence of phenomena as there is in cholera. The suppression of urine which has been very generally observed in these cases,² being liable to be followed by temporary albuminuria, by the development of a blue-colouring principle in the urine,³ and, finally, by temporary glycosuria. Many of the older writers on diabetes, including Rollo, Cruikshank, Hodgkin, and others, were of opinion that the presence of sugar in the urine was a result of gastro-intestinal disorder, and M. Dezeimeris⁴ has directly referred it to an anterior gastro-enteritis. Dr. Pavy⁵ seems to have been at least willing at one time to have entertained the same opinion, for he writes, "I have often thought that I could trace a connection between diabetes and an irritable state of the alimentary mucous membrane. . . . The idea, in fact, has occurred to me whether a certain state of the digestive canal may not, by reflex action through the sympathetic system, occasion diabetes." Sir Thomas Watson,⁶ Dr. Garrod,⁷ Prof. Griesinger,⁸ and other writers, have referred to the practice

¹ 'Medico-Chirurgical Transactions,' vol. li, 1868, pp. 1—43.

² 'Dict. Encyclop. des Sciences Médicales,' art. "Albuminurie," tom. ii, 1865, pp. 495 *et seq.* See also a paper by Munk and Leyden, "On Albuminuria and Steatosis in poisoning by acids and especially by Sulphuric Acid," cited in 'Gazette Hebdomadaire,' 20 Janvier, 1865, pp. 44, 45.

³ A considerable amount of evidence has been accumulated to illustrate the occurrence of albuminuria, and of a blue-colouring principle in the urine, in gastro-intestinal affections, which, owing to the limited space at the author's disposal, may be more conveniently referred to on another occasion.

⁴ 'Mémoires de la Société Médicale d'Emulation de Paris,' tom. ix, 1826, p. 231.

⁵ 'Researches on the Nature and Treatment of Diabetes,' 2nd edit., 1869, pp. 197, 198.

⁶ 'Lectures on the Principles and Practice of Physic,' 3rd edit., 1848, vol. ii, p. 603.

⁷ 'British Medical Journal,' 1857, p. 321.

⁸ 'Archiv für physiolog. Heilk.,' tom. i, 1859; and 'L'Union Médicale,' 1862.

of drinking a large quantity of cold water when the body has been overheated as a cause of diabetes. Dr. John Grove has informed the author that he has often detected sugar in the urine in cases of typhoid fever, especially in young patients, about the twenty-seventh day of the disease; but it does not appear that his observations have as yet been verified either by Dr. Murchison or by other writers on this disease. Dr. Robinson Hill¹ detected sugar in the urine in a small series of four cases of burns, in which, as is well known, ulceration of the duodenum is liable to occur, and in which, without any special affection of this kind, there may be, as in the case lately observed by Dr. Sutton,² diarrhœa with collapse, and post-mortem appearances very closely resembling those of cholera. M. F. Devay³ (of Lyons) has observed a case of temporary glycosuria, which continued for a year and a half, and which disappeared on the expulsion of a tænia. Dr. Latham⁴ states that in at least two cases of poisoning by arsenic which had come under his own observation there was, as a subsequent result of the poisoning, gradual emaciation and diabetes, and from the observations of Dr. Thudichum⁵ it would appear that in "all cases" of mercurialism, the urine affords indications of the presence both of albumen and of sugar. Dr. Christison⁶ has likewise detected both albumen and sugar in the urine as a result of dyspepsia. M. Becquerel⁷ has found sugar in the urine in a case of chronic diarrhœa and in one of slight enteritis. Sugar has also been found in the urine by Dr. George Harley⁸ after eating cheese or other indigestible food. This last-named observer has remarked that asparagus salad caused saccharine urine in himself; and a case of the same description has come under

¹ Beale's 'Archives of Medicine,' vol. ii, 1861, pp. 172—178.

² 'British Medical Journal,' July 2nd, 1870, p. 7.

³ Cited by M. E. Gueneau, "De la Glycosurie Passagère," 'Thèse de Paris,' 1866, p. 16.

⁴ 'Facts and Opinions concerning Diabetes,' 1811, p. 216.

⁵ 'A Treatise on the Pathology of the Urine,' 1858, p. 408.

⁶ 'Edinburgh Monthly Journal,' vol. xii, 1851, pp. 554, 555.

⁷ 'Bull. de la Soc. Méd. des Hôp. de Paris,' tom. iii, 1864, pp. 368, 369.

⁸ 'L'Union Médicale,' tom. xii, 1858, p. 116.

the author's observation in which asparagus (cooked) invariably caused temporary glycosuria. In pursuance of this subject it may be further remarked that in a case observed by Dr. Cardan,¹ of "Diabetes induced by an overdose of Nitrate of Potash," which was brought before the French Academy of Sciences on January 15th, 1849, the first result of the poisoning, it is stated, was great irritation of the intestinal mucous membrane, and abundant diuresis, followed by a strong desire for eating and drinking, with easy and rapid digestion; notwithstanding which there was gradual emaciation, and the diuresis increased till as much as five quarts of urine containing sugar were passed every night. The strong desire for food and the ability to digest it, which Dr. Cardan refers to in this case, are very suggestive, for when in cases of confirmed diabetes, in which, as is well known, both the appetite and the digestion are apt to be abnormally increased, these conditions, as regards the alimentary canal are reversed, an opposite result as regards the urine, is produced. This was very noticeable in Dr. J. W. Ogle's² case of diabetes associated with disease of the brain, in which, when paralysis "with dysphagia and vomiting" came on "sugar ceased to be found in the urine, even though farinaceous food was permitted," and it fully accords with what has been long since observed by Dr. Budd and Mr. Busk,³ who found that diabetes was completely arrested by an attack of cholera. In like manner Dr. H. Bell⁴ found that in diabetic patients "active purging or abundant diarrhoea has a powerful effect in diminishing the quantity of urine and even of the sugar contained in it. But this effect," he remarked, "is only momentary; as soon as the alvine function is re-established to its normal state the alterations of the urine reappear with the same intensity." It has also been observed by M. Claude Bernard⁵ that when the digestive functions are disturbed

¹ 'Lancet,' 1849, vol. i, p. 155.

² 'St. George's Hospital Reports,' vol. i, 1866, p. 166.

³ 'Med. Chir. Trans.,' vol. xxi, 1838, p. 157.

⁴ 'An Essay on Diabetes,' translated by Alfred Markwick, 1842, p. 40.

⁵ 'Leçons de Physiol. experim.,' tom. i, 1855, pp. 180, 181.

sugar disappears from the urine; and he mentions the case of a diabetic woman "who had, at the same time, a chronic affection of the intestines. From time to time this latter affection passed into the acute state, and the patient had attacks of colic and diarrhœa. Immediately these symptoms appeared the sugar ceased to show itself in the urine, but it reappeared as soon as the intestinal affection abated. I saw," adds M. Bernard, "these alternations reproduced five or six times."¹

The temporary occurrence of sugar in the urine, as may be readily inferred from what has been previously said on the subject, is not limited to such cases as the preceding, but may often be recognised during convalescence generally from acute disease, when there is, as in the case of Dr. Cardan and others already described, both a strong desire for food and also the ability to digest it. M. Bordier,² who has lately written a paper on this subject, states "that glycosuria is a phenomenon nearly normal in the convalescence of acute diseases;" and he refers to the fact, which is interesting from its connection with the temporary glycosuria of cholera, that in certain cases similar to those in which glycosuria is developed "the blue coloration appears."

It would, perhaps, be unnecessary, at this stage of the inquiry, to stay to consider the temporary occurrence of glycosuria in other morbid states of the system, which equally admit of being referred to a restorative effort to repair some previous waste or loss; but it may be useful to notice, with reference to the coincidence of sugar in the urine with local arrest of the circulation, such more espe-

¹ A paper by the late Dr. William Macintyre on "Cases of Perforation and other lesions of the Stomach occurring in connection with Diabetes Mellitus, with Observations on the Gastric Origin of that Disease," was read at the Royal Medical and Chirurgical Society, March 27th, 1849; and was reported in the 'Lancet,' 1849, vol. i, p. 376. As the history of the three cases given in this paper is obscure, and as the gastric lesion may not improbably have been a post-mortem occurrence, this paper cannot be referred to with any advantage on the present occasion.

² "De la Glycosurie dans la Convalescence des Maladies Aigues," 'Archives Générales de Médecine,' 6e. sér., tom. xii, 1868, pp. 188—190.

cially as has been observed in cases of gangrene, carbuncle, and tubercle, that the recent experiments of Prof. Schiff, which have been cited and accepted by M. Jaccoud,¹ tend to establish that gangrene, contrary to the opinion entertained by many observers, may be the primitive accident, and produce, as secondary effect, the diabetic state; "in other terms," adds M. Jaccoud in illustration of M. Schiff's experiments, "the changes produced in the circulation by the local mortification would be sufficient to give rise in the blood to diabetic ferment, which is, according to this eminent observer, the only and constant cause of diabetic glyco-genesis." And this leads to the consideration of the character and the extent of the experimental evidence which can be adduced to show that choleraic glycosuria is the result of a restorative effort consequent on a previous affection of the abdominal sympathetic nervous system, such as would be capable of temporarily producing a central arrest of nutrition and a local stagnation of blood.

It is obvious that, in all experiments on the sympathetic nerve, the primary effect produced must be on the vascular system, to which its branches are distributed; and that any effect produced on other parts of the organism must be secondary to this. When recognising, therefore, vascular paralysis as the primary result of section of the sympathetic nerve in all (or nearly all) parts of the system, it is important to notice that in the secondary results produced, no such constant uniformity has been observed, since these are liable to vary according to the locality in which the experiment has been performed. With reference more especially to the occurrence of temporary glycosuria, all experimental observers are agreed that section of the sympathetic in many parts of the system occasions local hyperæmia and saccharine urine; but it has also been observed that in some parts of the system the primary effect of local hyperæmia consequent on section of vaso-motory nerves has not always been followed by an appearance of sugar in the urine. For example,

¹ Loc. cit., art. "Diabète sucré," p. 279, 1869.

whilst section of the vertebral sympathetic leads to temporary glycosuria, section of the carotid sympathetic is followed by no such result.¹ This difference may possibly be connected with the anatomical fact that the sympathetic nerve at its cephalic extremity divides into two cords, the one vertebral, and the other carotidean;² and it is perfectly consistent with Chossat's³ observation that in death by starvation there is, in the midst of losses sustained by other organs, absolutely no loss of weight sustained by the brain itself; and also with the singular fact observed by M. Claude Bernard,⁴ that in cases of poisoning by curari, in which the urine, after a certain time has elapsed, becomes saccharine, all the nutritive functions are exaggerated, and at the same time the secretions are produced in unequal abundance; the secretion, for example, of the submaxillary gland being much more profuse than that of the parotid gland. But although this part of the inquiry may at present seem to be somewhat obscure, yet it is not unreasonable to expect that such observations will ultimately help to explain why, coincident with a central arrest of nutrition, the cerebral faculties during cholera are unimpaired. Some additional light has very recently been thrown on this part of the inquiry by the observation that not only is section of the splanchnic nerves, like section of the carotid sympathetic, unaccompanied by glycosuria, but that after this operation has been performed, neither irritation of the floor of the fourth ventricle, nor of

¹ It was observed by Dr. Pavy (op. cit., 1869, p. 177) that alkalies injected into the veins before operating on the sympathetic nerve prevent glycosuria; whilst, on the contrary, phosphoric acid (which was selected for the purpose) either swallowed or injected into the veins, causes saccharine urine without any previous nerve-section. The importance of this experimental evidence is illustrated by the fact that the temporary glycosuria which occurs as a sequel of cholera is preceded by diminished alkalinity of the blood. ('On the Nature of Cholera as a Guide to Treatment,' by Wm. Sedgwick, 1866, second issue, pp. 82—84.)

² M. Bourguery, "Extrémité Céphalique du Nerf Grand-Sympathique,"

'Archives Générales de Médecine,' 4e sér., tom. viii, 1846, p. 119.

³ 'Recherches Expérimentales sur l'Inanition,' 1843, pp. 90, 91.

⁴ Op. cit., 1855, tom. i, pp. 372, 373.

the distal ends of the cut nerves, is capable of giving rise to sugar in the urine. There is perhaps, with reference to the occurrence of temporary glycosuria as a sequel of cholera, no fact in experimental physiology more significant than this absence of sugar from the urine after section of the splanchnic nerves, which taken in conjunction with the fact just stated, that there is a corresponding absence of sugar from the urine after section of the carotid sympathetic nerves, would lead us to anticipate that the urine during collapse, and for some time afterwards, will, as a rule, be free from sugar, and that the intellectual faculties will at the same time be unimpaired. It appears to have been first pointed out by Eckhard¹ in 1867, that after section of the splanchnic nerves, glycosuria could not be produced. But it was not till the publication of M. Moreau's² experiments in the following year that the connection between these nerves and cholera itself was experimentally demonstrated, when it was shown that section of them was followed by an intestinal flux, possessing essentially the same character as the flux in cholera.³ The evidence afforded by M. Moreau in these experiments of an intestinal flux following section of the abdominal nerves accords with the observations of earlier experimental physiologists, who have noticed that section of the sympathetic nerve in other parts of the body has in like manner been followed by a flux.⁴ But in addition to

¹ 'Beiträge zur Anatomie und Physiologie,' 4ter Band, 1st. heft, 1867.

² 'Comptes Rendus des Séances de l'Académie des Sciences,' tom. lxvi, 1868, pp. 554—557; and 'Bulletin de l'Académie Impériale de Médecine,' 31 Mai, 1870, pp. 388, 389.

³ Attention may be usefully directed to a paper by M. Demarquay ('Mémoire sur les modifications imprimées à la température animale par la ligature d'une anse intestinale,' 'Gazette Hebdomadaire,' tom. vii, 1860, p. 825), in which it was shown that "the phenomenon of coldness which is often observed in man under the influence of hernia or of internal strangulation, and which may simulate cholera in its algide period, is due to a constriction more or less strong of an intestinal fold. The lowering," adds M. Demarquay, "has been so much the more marked the higher the ligature has been placed on the digestive tube."

⁴ M. Pourfour de Petit, 'Histoire de l'Académie Royale des Sciences,' Année 1727. Paris, 1720, p. 14; M. Dupuy, 'Journal de Médecine, Chirurgie, Phar-

increased secretion as a result of sympathetic nerve section, it has been specially observed by M. Schiff¹ that an organ in a state of neuro-paralytic hyperæmia is peculiarly susceptible of local irritation, and in his remarks on "the phenomena consecutive to extirpation of the abdominal portions of the great sympathetic in relation to the stomach," he has helped us to gain an insight into the initial pathology of the flux in cholera, which becomes still clearer when viewed in connection with the fact (of the correctness of which M. Schiff has assured himself by repeated experiments), that after extirpation of the coeliac ganglion there is no interference with the mechanism of vomiting, since animals operated on in this manner are affected exactly as in the normal state by ipecacuanha or antimony; and which, moreover, admits of being subsequently illustrated and confirmed by Pacini's² microscopic observation on the gastro-intestinal mucous membrane after death from choleraic collapse.

When this neuro-paralytic condition of the digestive canal is compared with what occurs after the influence of the central portion of the sympathetic nervous system has been artificially increased by the application of galvanism or electricity to the part during life, it will be found that the results then obtained are essentially opposed to those which follow arrest or diminution of this influence, either from section of the nerves or from cholera. This has been well shown in Messrs. Linati and Caggiati's³ observations on the effects

macie, &c.,' tom. xxxvii, 1816, pp. 340—350; M. Rouget, 'Leçons sur le Diagnostic et le traitement des principales Formes de Paralysie des Membres Inférieurs,' par C.-E. Brown-Séquard; traduit de l'Anglais par le Dr. Richard Gordon; 2e édit., 'revue et annotée par l'auteur, précédée d'une Introduction sur la Physiologie des Actions Réflexes empruntée aux Leçons de M. le Professeur Ch. Rouget,' Paris, 1865, pp. 39, 40; and M. Claude Bernard, 'Journal de la Physiologie,' tom. v, 1862, p. 410.

¹ 'Leçons sur la Physiologie de la Digestion, faites au Muséum d'Histoire Naturelle de Florence,' tom. ii, 1867, pp. 440, 441.

² 'Du Choléra Asiatique,' traduit de l'Italien par le Dr. E. Janssens, Bruxelles, 1865, p. 11.

³ 'Recherches Expérimentales sur les effets du Courant Electrique appliqué au Nerf Grand-Sympathique,' Parme, 1859.

of the electric current applied to the great sympathetic in man, and in some of the lower animals, during an otherwise undisturbed state of the parts. In these experimental investigations the composition and modification of the urine were the principal objects of research, and they will serve to illustrate what occurs during restorative as distinguished from febrile reaction in cholera, when owing to an unduly increased activity consequent on a previous suspension of organic function urea is formed in excess and sugar is passed in the urine. It was noted by these observers that the prolonged application of the electric current to the organs which are supplied by the great sympathetic had the effect of increasing the appetite, of quickening the digestion, of rendering more active the absorption by the stomach and intestines; one of the consequences of which was that the fecal matters became more solid and united; and, in addition to an increased amount of urea in the urine, it led also to the more rapid diffusion of sugar in the course of circulation and in the urine.

It may be urged against this proposed explanation of the temporary glycosuria, which occurs as a sequel of cholera, that if sugar in the urine be thus due to a restorative reaction from previous arrest, either local or general, of nutrition, and consequent stagnation of blood, that it fails to account for the occurrence of sugar in the urine during lactation and foetal existence, when there appears to be no diminution or arrest, but, on the contrary, and especially in the foetus, increased rapidity in the circulation of the blood. There is, it must be admitted, some difficulty at first sight in replying to this objection, for although alimentation through the medium of the stomach does not occur in the foetus, and nutrition during lactation is insufficient for some at least of the wants of the maternal system, yet many observers would probably be unwilling to allow that the sugar which occurs in the urine at these times can be immediately referred to the previous stagnation of blood.

Notwithstanding the apparent force of this objection, there is no occasion to doubt that the temporary glycosuria which

occurs in such cases is essentially dependent on the same cause as the temporary glycosuria of cholera; and that so far from there being any widely marked distinction between the occurrence of this phenomenon in cholera, in lactation, and in foetal existence, there is, on the contrary, much that is common to them all. In a paper which was lately published "On the continuance of the Mammary Secretion when the Urine is Suppressed in Choleraic Collapse,"¹ it was shown that the continuance of the one secretion and the arrest of the other are to be accounted for by the antagonism which naturally exists between the two great functions of nutrition and reproduction; and that, owing to this antagonism, an interruption of the functions associated with nutrition does not, during the collapse of cholera, lead to any corresponding interruption of the functions associated with reproduction. As a result therefore of this independence, so to speak, of reproductive life, the secretion of milk during collapse is, as a rule, undiminished, if not sometimes even relatively increased; whilst all that belongs to the well-being of the foetus itself, including the integrity of the foetal membranes, and the requisite amount of the amniotic fluid, often remains undisturbed amidst the wreck which, in the maternal system, has followed a central arrest of nutrition. In addition to the evidence cited on that occasion, attention may be directed to Dr. Thudichum's² case of Cæsarian section, in which the bladder of the foetus was found to be full of urine, whilst that of the mother, who had died from cholera, was, as is usual, quite empty. For, apart from any influence which might have affected the general principle of life in the foetus, this presence of urine in its bladder shows, like the undiminished amount of amniotic fluid, that it has essentially an independent existence, which enables it successfully to withhold any contribution to the drainage which is fatal to the maternal system. Moreover, there is, strictly speaking, nothing exceptional in this independent retention of fluid for the well-being or otherwise of foetal existence, since the con-

¹ 'British Medical Journal,' September 19th, 1868, pp. 307—309.

² 'Simon's Ninth Report,' pp. 464, 465.

tinuance of the mammary secretion is an illustration of the same kind of independence, showing that the several functions associated with the maintenance of the species can, during the failure of the life of nutrition, be fully sustained, both directly as regards the life of the foetus in the womb, and indirectly as regards the life of the infant at the breast.¹

The chief difficulty therefore to be overcome before the occurrence of temporary glycosuria in these cases can be satisfactorily explained in accordance with the theory proposed is to determine the situation and extent of the previous stagnation of blood; for although an arrest of the circulation is very evident in cases of cholera, it cannot be so readily recognised during lactation and foetal existence, when a stricter investigation is consequently needed to enable us to locate its occurrence. The most satisfactory explanation of the excess of saccharine transformation and of consequent glycosuria occurring in these cases appears to be this: the sympathetic or vaso-motory nervous system is the moderator of secretion in virtue of its action as controller of the circulation, and it occupies a position which is

¹ The antagonism which has been referred to between nutrition and reproduction is in accordance with the observations of M. Legros ('Gazette Médicale de Paris,' 1866, p. 104), that paralysis of the branches of the sympathetic nerve distributed to erectile tissues, not only of the reproductive organs themselves, but also of other parts, instead of causing turgescence produces a less active determination of blood to the part; so that immediately after extirpation of the superior cervical ganglion, for example, in cocks and turkeys, the erectile tissue of the head on the operated side becomes pale and collapsed. The exceptional phenomena in the physiology of erectile tissue are associated with peculiarities of structure to which special attention has lately been directed by M. Legros himself ('Journal de l'Anat. et de la Phys.,' Ch. Robin, tom. v, 1868, pp. 1—24), and by Professor Ercolani, of Bologna (ibid., tom. vi, 1869, pp. 364—389); whilst the fundamental importance of the antagonism on which they depend admits of being very simply illustrated by what naturally occurs in many of the more lowly organised animals, and notably so in certain insects, in which nutrition is strictly limited to the earlier or caterpillar state, and is subsequently rendered impracticable during the later or reproductive period of existence, through a retrograde change having been effected in the organs of alimentation, in consequence of which such animals, more especially belonging to the male sex, cease not only to eat but sometimes even to possess a mouth.

functionally midway between the secretory surface on the one side and the supply of blood on the other. The activity with which consequently a secreting organ exercises its function is, within certain limits, regulated by the amount of blood which passes through the organ in a given time; the effect produced on the circulation being apparently the result of an influence reflected from cell-function; and when, from any cause, the influence emanating from cell-function and transmitted by the vaso-motory nervous system is either temporarily or permanently arrested, the secretion is apt to become immoderate, and at the same time the blood becomes stagnant. It is probable, but not as yet clearly demonstrated, that an excessive or long-continued exercise of secretory function in any organ is of itself sufficient to lead to weakening or exhaustion of the vaso-motory nervous influence of the part; and that the loss of this nervous influence being followed by stagnation of blood is relatively favorable to the continuance of the secretion, but, at the same time, is absolutely unfavorable to the general nutrition of the system, at the expense of which it would, without any equivalent being given in return, continue to be maintained. The fatal character of the flux in cholera may, in accordance with these views, be readily explained, without any necessity for assuming that the flux itself, either with reference to quantity or quality, ought on its own account to be regarded as an essential element of danger, but rather as the expression of such an arrest of vaso-motory nervous influence, and consequent stagnation of blood at the fountain head of organic life, as must, if such arrest of nervous influence be continued, inevitably lead to death. And when, from the consideration of the flux in cholera, attention is transferred to the mammary secretion, the same principle of reasoning is available to account for what must be regarded, so far as the general nutrition of the mother is concerned, as an excessive and exceptional activity of function on the part of the mammary gland, the exercise of function in this case being excessive, as there is no adequate retribution made for the loss thus sustained; and exceptional, as it is not the

customary condition of the gland. In this respect it is obvious that the uninterrupted continuance of the mammary secretion would be indicative of such diminution or arrest of the local circulation of the blood as must be sufficient to account for the temporary glycosuria which has been observed to be coincident with it, and to cease when the mammary gland no longer secretes milk.

The explanation of the temporary glycosuria which has been observed to occur during the earlier stages of foetal development is founded on the same physiological reasoning ; for the occurrence of glycosuria during this period of existence is primarily referrible to the placenta, which is at once the most active of the secretory organs of the foetus, and, moreover, is the organ on which it has to depend exclusively for support. It is apparently in consequence of the placenta being thus as it were the central organ of nutrition for the foetus that there is, as regards the anatomical character and distribution of its vessels, special provision for securing a structure favorable to a local delay of blood, and consequently favorable to an excessive activity of function.

The presence moreover, especially during the earlier stages of embryonic life, of an amyloid substance in the cells of the placenta which, according to Dr. McDonnell,¹ "is found in large quantities (in the placentæ of cats and of rabbits) at a time when the growth of the foetus is progressing rapidly," and which, according to the same observer, "has either totally or almost totally disappeared from the placenta, shortly before the birth of the young," seems to show that in addition to the supply of blood there is in these elementary structures a special provision for securing an excessive exercise of cell function. And this supposition is strengthened by an examination of the tissues of the foetus itself ; in which, as in the placenta, there is, during embryonic development, a large accumulation of amyloid substance, which is much diminished if it does not altogether disappear before birth. From this examination of its tissues it may conse-

¹ 'Observations on the Functions of the Liver,' 1865.

quently be concluded that as there is in the foetus no such differentiation of the functions of organic life, as is met with after birth—foetal existence representing what is essentially a very low type of organic life—so likewise there is, as regards the formation of sugar, an absence of that localisation of amyloid substance, which, after birth, is normally limited or nearly so to the liver; but which, during embryonic life, is diffused through the foetal tissues in such a way that according to Dr. McDonnell “it would appear to be the formative material from which these tissues are evolved, and would seem related to their growth and development, as starch is to the growth and development of vegetables.” Hence the occurrence of foetal glycosuria which is restricted, as a rule, to the earlier months of intra-uterine life, and which ceases altogether before birth, is an indication that in the series of organic changes in which nutriment is prepared for and applied to the development and growth of the system, the amount supplied is, at some stage of the process, greater than the amount which can be either sufficiently elaborated or employed.

In conclusion it may be urged that the same tendency to increase of fatty matters in the blood which occurs in cases of defective nutrition prevails also in cases of cholera, in which it has been observed that “the fatty matters (of the blood) are nearly doubled (and sometimes trebled) in quantity:”¹ and although there is a want of sufficient

¹ MM. Becquerel and Rodier's ‘Pathological Chemistry,’ translated by Dr. Speer, 1857, pp. 90 and 131.

The occurrence of diabetes in unusually fat individuals has been noted by many writers on the disease, among whom may be cited Dr. Prout (op. cit., 5th edit., 1848, pp. 30, 31), Dr. Bence Jones (‘Med. Chir. Trans.,’ vol. xxxvi, 1853, pp. 402—419), Dr. J. W. Ogle (loc. cit., 1866, p. 160), M. Jaccond (loc. cit., 1869, p. 296), and Prof. Seegen, of Carlsbad (‘Contributions à l'étude clinique du Diabète Sucré,’ ‘Archives Générales de Médecine,’ 1867, pp. 295—313; reduced from a series of memoirs in Virchow's ‘Archiv für Pathologische Anatomie und Physiologie,’ 1861—1866). The last-named observer, who has had great opportunities for studying this subject, states that in more than thirty per cent. of the cases which had come under his own observation an excessive corpulence had preceded the diabetes.

information respecting the relation of fat to sugar which checks for the present any attempt to follow the successive steps of the process, yet, as regards secretion in general, recent discoveries in physiology have afforded some glimpses of the truth respecting the value and use of these ternary compounds, of which it may be said that whatever importance they possess in the work of life they are not essential constituents in organic structure. Further research may possibly establish an antagonistic character in the relation between them, and show that they are respectively the cause and the result both of progressive and of retrogressive change in organic life. But for the present it must suffice to say that the occurrence of sugar in the urine in the cases above referred to, as a consequence of long-continued and immoderate secretion, leads to the inference that all secretion is in like manner associated with saccharine transformation:¹ and that whilst, on the one hand, an excess of secretion is accompanied by a corresponding excess in the formation of sugar, and consequent glycosuria; a moderate exercise of secretory function is, on the other hand, accompanied by a correspondingly moderate formation of sugar, which is not more in amount than can be readily disposed of in the system; and that it is only when the blood contains sugar in excess, from such causes as those already mentioned, that some of it is in consequence eliminated by the kidneys. Consequently, the temporary glycosuria which occurs as a sequel of cholera should serve to show that during reaction from previous collapse there is a temporary excess of restorative effort; and although, as is well known, an abortive attempt at reaction in this disease is a very common cause

¹ This suggestion may be illustrated by what has been observed with reference to the Thymus; for sugar has been found by Friedleben (*'Die Physiologie der Thymusdrüse,'* 1858) to characterise its functional activity, especially during the early period of infancy, when this organ appears to be especially subservient to the growth of the body; and Schiff (*'Journal de l'Anat. et de la Phys.,'* 1866, p. 374) in referring to "the very pronounced sugar-forming property," which he has recognised in the Thymus of rabbits, expresses the opinion that it may be due to the chyle which it contains.

of death, yet in those cases of cholera which terminate favorably and in which glycosuria has been observed to occur during convalescence, the subsequent disappearance of sugar from the urine may be accepted as evidence in favour of the normal balance of organic function having been satisfactorily restored, and that the tendency to excess during recovery from a central arrest of nutrition has ceased.

ON THE
DURATION OF PHTHISIS PULMONALIS
AND ON
CERTAIN CONDITIONS WHICH INFLUENCE IT.

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It requires no small courage to draw the attention of this Society to such an important subject as the duration of life in phthisis, at a time when the various states of the lung included under that term are undergoing a searching investigation and discussion, and at the threshold of our inquiry we are met with the very natural but nevertheless difficult questions, "What do you mean by phthisis? What morbid states of the lungs do you include under that term? Do you restrict it to cases in which tubercle is present, or do you make it embrace scrofulous pneumonia, chronic catarrhal pneumonia, and other conditions of lung which tend to caseation and excavation?" To these questions I reply, that in this paper the term phthisis is used in a broad comprehensive sense and signifies a consuming pulmonary disease, beginning in consolidation, generally of the upper part of the lungs, which may or may not be tubercular, tending more or less to excavation,

accompanied by the well-known group of symptoms, indicating irritation, decay, and wasting; viz., constant cough with opaque expectoration, progressive loss of flesh, strength, and breath, frequently, night sweats, and occasionally, hæmoptysis and diarrhœa; originating in various causes, such as diseased conditions of the blood, inflammation, catarrhal, croupous, or parenchymatous, and the like.

The object of the present paper is to give some account of a thousand cases of phthisis selected from the private practice of Dr. Williams and myself, and to deduce as far as possible, from the data at command, the amount of influence which the conditions of age, sex, family predisposition and origin, exercise on the duration of the malady.

The patients for the most part, belonged to the upper and middle classes of society, and as statistical information of disease among these classes is rare, it is hoped that the present contribution may prove acceptable, as affording some facts capable of comparison with the results of hospital experience which have been well set forth by the Brompton Hospital Reports and by Dr. Pollock and others.

It will be well when judging of the statistics to bear in mind the advantages which many of these patients enjoyed over the poorer classes, in the avoidance of those ills which arise from poverty, exposure to cold, unhealthy atmospheres and occupations, and in the opportunities of rest, change of climate, better living and exercise.

The cases which form the basis of this paper amount to one thousand, and they have been selected from the records of a far larger number, on the ground of their being one year at least under observation. I hope there will be no misapprehension on this point. They are avowedly *selected* cases, and the ground of their selection was adopted after considerable deliberation, for the following reasons. Our object is not to determine the duration of cases of consumption in which little or no exertion has been made to check the downward progress of the disease; the natural history

of phthisis is, alas, too well known, and a graphic account of it may be found in the pages of Louis and others. We aim at finding out what effect can be produced on the duration by the fair and discriminating use of remedial means, and for this purpose it is obvious that we must select patients who have been under observation for a time sufficient to yield results, and not those who have been seen only once or twice and then lost sight of. A large number of patients who consult a physician come once only; others but two or three times within a short period and then pass out of his field of observation. Such cases, although supplying useful information as to the origin and varieties of the disease, are of no value with reference to its treatment, results, or duration. Yet because these cease to attend is no proof that they derive no benefit; many come only to ascertain the physician's opinion, and are unable, through scanty resources or through distance from town, to repeat their visits. We must not conclude, however, that, because they do not continue to attend they are unfavorable cases and likely to terminate within the year; on the contrary, all the evidence that we can collect points to a different conclusion. Patients frequently reappear on the scene, years later, who after one or two visits had been lost sight of and had been carrying out treatment steadily, but had been prevented by various causes from visiting the physician for a long period. Exceptions should, however, be made of those cases which are known to have proved fatal in one year, and these, which can and have been traced by means of the obituary of the newspapers, are found to be few and may be balanced against the much larger number reported as having much improved after a few months' treatment and as affording promise of permanent recovery.

From having watched the course of the disease in several thousands of cases and from having investigated the records of many thousands more, I have come to the conclusion that comparatively few cases of phthisis die under one year, and I find this conclusion to be shared by physicians who have had the largest experience of the malady.

In order to arrive at an estimate of the proportions which the cases, fatal within the year, bear to those more or less improved, I have carefully examined the records of every case of phthisis occurring during one year, the year being selected at hazard, as a sample, from the period of twenty-two years. Of 433 consumptive patients who consulted Dr. Williams for the first time in 1863, 245 were seen only once, and no more was heard of them; 84 were one year and upwards under observation, and were, therefore, among those selected for our tables. Of 104 patients whose subsequent history was known for periods under one year, 8 died, 13 were at the last visit rather worse, 3 were about the same, 75 were more or less improved, and 5 were quite restored to health. Thus, those improved and cured were ten times more numerous than the deaths. It can hardly be said that in taking the fact of the patient being at least one year under observation as the basis of our selection we increase the balance of favorable results, but we thereby deal with facts more carefully observed and more conclusive in relation to the real efficacy of treatment.

The cases were extracted from the note-books of Dr. Williams and arranged in tables containing twenty-five each, under the headings of—

Age.

Sex.

Family predisposition.

Date of first symptoms.

Origin of disease.

Occurrence of hæmoptysis.

Date of first visit.

State of lungs, as evidenced by physical signs.

Treatment (by medicine and climate).

Result.

Duration, and state of patient at last visit.

No. of Case.	Sex & Age.	Family pre-disposition.	Date of 1st symptoms.	Origin of Disease.	Hæmoptysis.	Date of 1st visit.	State of lungs as evidenced by physical signs.	Treatment.		Result.	Duration and state of patient.
								Medicinal.	Climatic.		
1654	27 M	Mother died of phthisis	3 months ago	...	None	May 7, 1861	Dulness; cavernous sounds upper right, most marked posteriorly; tubular sounds above left scapula	Oil taken previous to visit. Ol. Acid. Phos. Strychn. b.d. Linect. Morph. Liniment. Acet. Canth. Dec. 12th. Magnes. Sulphat. p. and n.	...	Dec. 12, 1861.—Had offensive expectoration, streaked with dark blood, but was better throughout the summer, except some cold and cough; had hæmorrhæa several times; abdomen swollen and tender; tumor in left hypochond. March 12, 1862.—Hæmorrhæa continued till one month ago, but has greatly improved; gained flesh, and walks fourteen miles a day; cough slight; physical signs less; no tumor. October 20, 1863.—Continued better till August; when in Jersey left off oil, and since has lost two stone; cough worse; throat bad, and has piles. Cavernous sounds upper right, tubular upper left. November, 1868, tolerably well.	Tolerably well. 7 years 9 months
1719	25 F	None	1 year 4 months ago	Bronchitis	None	Oct., 1861	Dulness; slight crepitation left front, less in back	Ol. Acid. Phos. Calumb. Aur., b.d.	Bournemouth 1 winter before 1 winter; Biarritz 1 winter; Rome 1 winter.	Well. Hoarse at first, but lost cough at Pau at Christmas; physical signs improved, viat; Pau and walks several miles; sometimes wheezy; tubular sounds both scapular regions.	Well. 4 years 1 month.
1551	51 M	None	3 months ago	...	31 several times	Mar. 5, 1862	Dulness; tubular sounds upper left, most front	Ol. Acid. Nitric. et Hydrocyan. Lupul. Aurant. b.d. Lin. Crot.	... Recovered under oil in seven months; when seen in 1862 was tolerably well, with slight cough and slight physical signs. Died in June, 1869.	Dead. 17 years 6 months.	

Some of the results of the first 500 cases were published in the 'Lancet' of 1868, but since then 500 more cases have been collected, and no pains have been spared to render the information respecting the whole thousand as complete and accurate as possible.

Where the patients had been lost sight of for several years without having been announced as dead, a correspondence was opened, either with themselves or their friends, to ascertain whether they were alive and in what state of health—a correspondence which when addressed, as it often had to be, to the individual whose life was suspected, sometimes evoked ludicrous answers.

Reference to the various lists, the 'Army and Navy,' 'University,' 'Clergy,' and 'Law,' to the 'Court Guide,' and to the 'Peerage,' has often afforded valuable information; and on this point private practice has great advantages over hospital statistics, for, in respect of the former, by some means or other, patients can be traced through a number of years, whereas, in the latter, they are generally lost sight of when they quit the hospital.

Nevertheless, a certain number of the tabulated cases could not be traced up to the present time, and of these the date when last heard of, with notice of their then state, is registered.

Sex.—Of the 1000 cases 625 were males and 375 females, or 62·5 per cent. of the former, 37·5 per cent. of the latter. This preponderance of males cannot be regarded merely as accidental, for it is closely in accordance with the evidence of the first report of the Brompton Hospital, where the percentage of males was 61; and that of females 39. Among Dr. Pollock's¹ out-patients 60·75 per cent. were males, 39·25 females.

Age.—The ages of the patients have been arranged in the following table.

¹ 'Elements of Prognosis.'

TABLE I.—*Showing Age at Time of Attack of 1000 Patients (802 living, 198 dead).*

	Males.		Females.			
	No.	Percentage.	No.	Percentage.	No.	Percentage.
Under 10 years.....	10	1·60	8	·8	18	1·8
10—20 years.....	86	13·79	96	25·6	182	18·2
20—30 „	245	39·20	173	46·13	418	41·8
30—40 „	183	29·28	66	17·60	249	24·9
40—50 „	70	11·20	24	6·40	94	9·4
50—60 „	22	3·52	8	2·33	30	3·0
60 and upwards	9	1·44	5	1·33	14	1·4
	625		375		1000	

This table differs in one point from many similar records. Instead of the age at first visit the age at first attack is tabulated, and this is arrived at by subtracting the history from the age at first visit. The date thus obtained is of far more consequence in estimating the duration of disease and the conditions which modify it than the age at first visit, which depends upon shifting circumstances, as, for instance, the feeling and opportunities of the patients, who may come under the observation of the physician either at the commencement of their disease, or many years after, near its termination. The record of their age at the time of the first visit would, therefore, afford us but slight information as to the time of attack or its duration. It may be objected that it is difficult always to arrive at accuracy as to the date of first symptoms, but this difficulty is often greater in hospital than in private practice from which these cases are taken, for the upper classes generally remember and narrate, almost too circumstantially for the physician, every symptom of their illness.

The results of this table accord with the commonly

received opinion as to the period of attack. Taking the sexes collectively, 41 per cent. were attacked between 20 and 30, about 24·9 per cent. between 30 and 40, 19·5 per cent. under 20, and 18·8 per cent. above 40. Considerable difference was found to exist between the two sexes as to the time of attack. Between 20 and 30, the most common period of attack for both sexes, about 7 per cent. more females were attacked than males, and again between 10 and 20, 11·8 per cent. more. On the other hand, after 30 the reverse was the case. Between 30 and 40 the males exceeded the females by 11·68 per cent., and above 40 by 6 per cent.

Deductions as to the effect of age on the duration of the disease will be drawn in a later portion of the paper.

The average age when attacked was, for the males, 29·47, and for the females, 26·06.

Family predisposition.—The registry of the absence or presence of this feature has been very carefully attended to, though there are many difficulties in the way of arriving at accurate conclusions, and it is very possible that errors, on the side of omission, have been committed. The term hereditary predisposition is used in various senses by different authorities; some include only parents, as did the first medical report of the Brompton Hospital, which in this way arrived at an average of 25 per cent. of cases in which the predisposition existed.

Dr. Fuller¹ included, in addition, grand parents, uncles, and aunts; and his calculations in this way reached 59 per cent. If we include the same list of relations that Dr. Fuller did, these 1000 cases number 250 hereditary instances or 25 per cent. of the whole; but it was thought advisable to substitute the term *family* predisposition for hereditary, as it admits of a wider meaning, and is intended to include besides the above-mentioned relations those of the same generation, *e. g.* brothers and sisters, and first cousins—the principle being to accept as instances of disease in the

¹ 'Diseases of the Chest.'

family all near blood relations derived from a common stock. The reason of this extension was to arrive at some conclusions about the numerous class of cases in which, although there is no history of hereditary taint in a family, the children on arriving at a certain age are attacked one after another with consumption. The number of cases having only brothers and sisters affected is very large, constituting 22 per cent., a percentage larger than that of any other class, and this alone is a sufficient ground for considering them, whatever be the cause of the prevalence of disease in a family, whether it be derivable from the stock or from endemic causes, damp, and the like. The number of cases of family predisposition was 484 or 48·4 per cent., being 270 among the males and 214 among the females, or 43 per cent. among the former and 57 per cent. among the latter, which shows an excess of 12 per cent. in the females.

The particulars were as follows :—

- 10 had grand parents affected.
- 43 had fathers affected.
- 67 had mothers affected.
- 10 had both parents affected.
- 48 had uncles and aunts affected.
- 72 had fathers' or mothers' family affected (particulars unknown).
- 224 had brothers and sisters affected.
- 10 had cousins affected.

484 Total.

Where more than one relation was affected, as was the case in 60 of these patients, it has not been thought good to make a double entry, but to record the nearest relative of the preceding generation, *e.g.* 'mother and brother' affected is entered under *mother*, 'father and sister' under *father*, and so on. The greater number of the duplicates occur in those of the same generation, as brothers, sisters, and cousins.

Origin and first symptoms.—In 685 cases the disease came on with the ordinary group of symptoms without any antecedent illness, but in a considerable number, viz. in 315, it either originated in, or followed closely after other diseases, as the following table will show. Phthisis was preceded by Pleurisy and pleuro-pneumonia in 149 cases.

„ Bronchitis in	118	„
„ Asthma (spasmodic) in . . .	7	„
„ Scrofulous abscesses in . . .	12	„
„ Fistula in	5	„
„ Hooping-cough in	6	„
„ Croup in	1	„
„ Scarlatina in	4	„
„ Measles in	2	„
„ Continued fevers in . . .	3	„
„ Peritonitis in	1	„
„ Malformation of the chest in .	2	„
„ Injuries to the chest and other organs in	5	„

315

The number arising from pleuropneumonia and bronchitis is very large, reaching a total of 267, or more than one quarter of the whole, and deserves attention as showing statistically the influence of these diseases as direct sources of consumption. It is well known to the profession, and especially to those connected with hospitals for diseases of the chest, how often a neglected case of pneumonia or bronchitis becomes, under depressing causes, one of consumption, but statistics proving this frequency are rare, if not wanting. This number, 267, or 26·7 per cent., high as it is, is probably much below a correct estimate for hospital patients, among whom the prevention or rapid cure of these diseases is much more difficult, and therefore less common than among their wealthier brethren.

In the cases of phthisis arising from pleuropneumonia the course of events was generally as follows. After the attack some portions of the lung remained consolidated or compressed by dense pleuritic adhesions, or both these lesions

existed and tended to cripple the lungs for their respiratory work; the breath remained short, the patient seldom or never lost the cough, which a fresh cold or some disordering influence caused to increase, muco-purulent expectoration, and sometimes hæmoptysis accompanying it. Signs of softening were detected in one or both lungs, followed by those of excavation, and the case assumed a consumptive aspect.

Of the cases of phthisis following bronchitis some arose from acute attacks, others from chronic. These last patients generally lost their cough and other symptoms in the summer or in warm weather, but were subject to a return of it every winter, or during inclement weather. A longer or more severe attack than usual greatly prostrated them; the cough now remained persistent, and was also accompanied by permanent feverishness, heat of skin, and wasting. On examination of the chest, in addition to the ordinary bronchitic sounds, patches of consolidation were detected; these did not clear up, and softening and excavation eventually took place, and the patient lapsed into phthisis. The clinical symptoms and changes which take place in the lungs have been well sketched by Dr. Burdon Sanderson in a clinical lecture delivered at the Middlesex Hospital.¹

Of the 149 cases originating in pleuropneumonia, in 85 no family predisposition could be traced, and this was also the case in 57 of the 118 instances arising from bronchitis.

Thus 142 physical patients, or 14·2 per cent., owed their attacks entirely, as far as could be ascertained, to inflammatory attacks of the lungs.

Time will not suffice to notice more fully the list of diseases on which phthisis supervened among these patients, but I would refer the Fellows of this Society to a paper of mine in the fourth volume of the 'St. George's Hospital Reports,' "On the Causes of Pulmonary Consumption," in which this portion of the subject is fully treated of as regards 800 of the present cases.

Hæmoptysis.—This symptom was recorded to have been

¹ 'Biennial Retrospect of Medicine of 1867-8,' Sydenham Society.

present in various degrees, at some period of the patients' history, in 569 cases out of the 1000, *i. e.* about 57 per cent., a percentage lower than that of the first 'Report of Brompton Hospital,' which was 63 per cent., but nearly agreeing with that of Dr. Cotton's¹ 1000 hospital cases, which was 53·6 per cent., and that of Dr. Pollock's 1200 hospital cases, which was 58·4.

State of the lungs as evidenced by physical signs.—I shall now endeavour to describe as briefly and succinctly as possible the state of the lungs of these patients when they came under observation at first, and afterwards to give some report of the changes which had taken place at the date of their last examination. The record of the physical signs has been perhaps more carefully carried out than any other point in these cases, and in perusing it, a fair idea can be easily obtained of the amount of disease present in each case, with its subsequent progress; but the selection of similar cases for the purposes of statistics, and their arrangement into as few classes as possible, has been attended with great difficulty.

The classification of the conditions of the lung, consolidation, softening, and excavation, respectively into first, second, and third stages, is open to objections, because such stages are not always well defined, it being sometimes difficult to distinguish between the end of the second and the beginning of the third, and again, various parts of the same lung may be in different stages. What different amounts of consolidation, too, may not the first stage include! Sometimes only a small portion of the lung, like that underlying the supra-scapular or the inter-scapular, or the infra-clavicular regions is consolidated; in other cases two-thirds or more are involved. However, it has been found difficult to avoid some such classification for the purpose of statistics, and, therefore, that of stages has been adopted, with the understanding that the first stage embraces various amounts of consolidation, and that the second and third are sometimes

¹ 'On Consumption.'

only different degrees of the state of softening and excavation. In none of the present cases is the evidence of physical signs alone accepted; in all it has been amply confirmed by the clinical symptoms and the course of the disease. The results have been embodied in a table (which is now annexed—see Table II) divided into two parts, showing the *state at first visit* and *state at last visit*.

From this it will be seen that 660 patients, or two thirds, were in the first stage at the first visit; 181, or 18 per cent., in the second; 145, or 14·5 per cent., in the third, and 14 patients presented the physical signs of other lung diseases, viz. bronchitis, pneumonia, pleurisy, and asthma, on which shortly afterwards supervened signs of consumption. Those in the second and third stages hardly constituted a third of the total, which shows how large a proportion came in the stage of consolidation, of which the prognosis was likely to be more favorable. Of those in the first stage both lungs were affected in 205, the right alone in 287, and the left alone in 168. Of those in the second stage 55 had the right lung alone affected; 69 the left alone; 57 had both lungs involved, and in many instances both in the second stage. Of the 145 in the third stage, 43 had the right lung alone affected, 53 the left, and 49 both; but in only 4 were cavities detected in both lungs. This indicates a greater liability of the right lung to consolidation, but of the left to softening and excavation; a conclusion confirmed by the evidence of the Second Report of the Brompton Hospital.

Having briefly considered the state of the patients at first visit, let us turn our attention to their state at last visit.

Of the 1000 patients, 198 (about $\frac{1}{5}$ th) were ascertained to have died, the deaths being distributed as follows—

15·75	per cent.	of those who came in the first stage.
26·51	”	”
30·34	”	”
		second stage.
		third stage.

Thus we see that the percentage of mortality of the

TABLE II.—*State of Lungs*

Stage.	No.	Per centage.	Particulars of state at first visit.	State at		
				Dead.	Healthy.	Im- proved.
1st	660	66.0	287 had the right lung alone affected	39	15	75
			168 had the left lung alone affected	25	9	48
			205 had both lungs affected	40	6	62
			660	104	30	184
2nd	181	18.1	55 had the right lung alone affected	15	1	13
			11 had the right lung in the 2nd stage, and the left in the 1st	5	...	4
			69 had the left lung alone affected	20	1	18
			35 had the left lung in the 2nd, and the right in the 1st ...	5	...	16
			11 had both lungs in the 2nd stage	3	...	2
			181	48	2	53
3rd	145	14.5	43 had the right lung alone affected	11	...	16
			5 had the right lung in the 3rd stage, and the left in the 2nd	2	...	3
			23 had the right lung in the 3rd and the left in the 1st ...	9	...	6
			53 had the left lung alone affected	14	1	13
			1 had the left lung in the 3rd and the right in the 2nd ...	...	...	1
			16 had the left lung in the 3rd, and the right in the 1st ...	8	...	3
			4 had both lungs in the 3rd stage .....	...	1	2
			145	44	2	43
	14	1.4	Presented physical signs of other lung diseases at 1st visit—			
			4 had signs of bronchitis,			
			4 had signs of pleurisy,			
			3 had signs of pleuro-pneumonia,	2	...	...
			1 had signs of asthma, 2 had doubtful physical signs,			
			14	198*	34	26
	1000					

Extension of Disease.

Out of 675 who had 1 lung diseased at first visit, the other lung was ascertained to be attacked in 131 (96 living, 35 dead).

Of those in the 1st stage the other was attacked in 85 instances; in 45 disease spread from right to left; in 40 from left to right.

Of those in the 2nd—Disease of right spread to left in 11 }
Disease of left spread to right in 13 } 24.

Of those in the 3rd—Disease of right spread to left in 4 }
Disease of left spread to right in 11 } 15.

Evidenced by Physical Signs.

Last visit.				Particulars of state at last visit.
About the same	Worse.	Unknown.		
19	110	29	=248	{ In 77, or 15·18 per cent., cavities are recorded to have formed; in 10, double cavities. In 24 the lungs went into 2nd stage, viz. 9, right lung being affected; 11, left; 4, both.
16	64	6	=143	
25	59	14	=165	
60	233	49	=556	611
5	20	1	=40	Cavities are recorded to have formed in 32, or 28·8 per cent.
1	1	...	=6	
4	23	3	=49	
3	9	2	=30	
...	3	3	=8	
13	56	9	=133	172
9	3	4	=32	{ At last visit 2 had 1 lung in 1st stage, 1 left in 2nd and right in 1st, and 1 had cavities in left and right in 1st. At last visit 1 had both lungs in 1st, 1 had right in 1st, 1 left in 3rd (1 died). At last visit 1 had right in 1st, 1 had right in 2nd and left in 1st, 1 had both in 2nd. At last visit 1 had both in 2nd. At last visit 1 had right in 1st (1 died).
...	...	1	=3	
3	4	1	=14	
10	14	1	=39	
...	...	...	=1
2	3	...	=8	
1	...	...	=4
25	24	7	=101	135 923
4	8	...	=12	{ At last visit 2 had 1 lung in 1st stage, 1 left in 2nd and right in 1st, and 1 had cavities in left and right in 1st. At last visit 1 had both lungs in 1st, 1 had right in 1st, 1 left in 3rd (1 died). At last visit 1 had right in 1st, 1 had right in 2nd and left in 1st, 1 had both in 2nd. At last visit 1 had both in 2nd. At last visit 1 had right in 1st (1 died).
102	321	65	=802	

Ratio of Deaths to Stages.

Of 660 in 1st stage 104, or 15·75 per cent., were ascertained to have died.
 Of 181 in 2nd stage 48, or 26·51 " " "
 Of 145 in 3rd stage 44, or 30·34 " " "
 Of 14 (see above), 2 " " "

* *Deaths.*—In 80 patients, in whom cavities were absent at first visit, they were ascertained to have formed before death, i.e., in 52 per cent.

second and third stage, as far as we know it, was very much higher than that of the first, the third showing actually a double proportion of deaths and the fact must not be overlooked, as demonstrating that although cavities may be tolerated for years, yet the danger from blood infection, after their formation, is considerably increased. In 80 out of the 150 in the first and second stages, cavities were ascertained to have formed before death.

The state at last visit of the *living* patients is arranged under five headings. 1st, *Healthy*, (when the physical signs of the disease have entirely disappeared). 2nd. *Improved*. 3rd. *About the same*.—This latter term is used to include, not only the cases in which no change has taken place, but also those which after various fluctuations towards better or worse, presented at the last visit about the same amount of disease as at first. 4th. *Worse*.—This heading is intended to signify extension of the disease, either in the same lung or in the opposite one, as well as progress in the way of softening and excavation. 5th. *Unknown*.—This term refers only to the state of the patient's lungs, not to his general health, which is not considered in this table. The table shows that, among 802 living patients, the last recorded state of the lungs was "healthy" in 34, "improved" in 280, "about the same" in 112, "worse" in 321, and "unknown" in 65. Excluding the "unknown" ones, the relative percentages are roughly, "healthy" $4\frac{1}{2}$ per cent., "improved" 38 per cent., "worse" $43\frac{1}{2}$ per cent., and "about the same" $13\frac{1}{2}$ per cent. If we take the cases in stages, and compare the numbers under "healthy" and "improved" with those under "worse," we find that whereas in the first stage the "worse" somewhat outnumbered the "improved," in the second they are nearly equal, and in the third the ratio is entirely changed, the number of the "healthy" and "improved" being nearly double that of the "worse."

Some further particulars about the changes that took place in the lungs may not prove unacceptable. Where registered as "healthy" or "improved," the improvement

in the physical signs of the patients in the *first* stage consisted of dulness diminishing either in extent or degree, or in both; of the breath and voice sounds becoming less tubular and more vesicular, and in some few instances of the signs disappearing altogether, the percussion and breath sounds becoming normal. In those of the *second* stage the crepitation diminished, and was replaced by breathing having generally some roughness or tubular character, which in some instances eventually gave way to healthy sounds. The favorable change in the physical signs of the *third* stage was shown by the dulness decreasing, the moist cavernous sounds becoming croaking and drier, the pectoriloquy being less marked, and audible over a smaller portion of the lungs, sometimes being replaced by the dry whiffing crackling sounds of emphysema, but generally by tubular breathing and bronchophony. These last signs have in some instances disappeared, except above and within the scapulæ, where, with slight remaining dulness, they could generally be detected after they had vanished from other parts of the chest.

The cases of restoration to complete health number 34, and include 30 recoveries from the first stage, 2 from the second, in each of which only one lung was involved, and 2 from the third stage, in 1 of which, wonderful to relate, were cavities in both lungs; but they were small, and the long duration of the case, viz. 22 years, afforded time for their contraction and obliteration. In 16 cases out of the 1000, calcareous expectoration is noted; in 20, contraction of cavities; in 2 contraction of the lung, without the formation of a cavity, and in 16 emphysema of the lungs were recorded. So much for the "improved" and "healthy" classes.

Under the heading of "worse," we find that among cases of the first stage, in 77, or 15 per cent., cavities were formed in one lung; in 10 in both lungs; and that softening took place in 24 others. Of those in the second stage at first visit, cavities are recorded to have formed in 32, or 28·8 per cent.

In order to arrive at satisfactory data, as regards extension of disease from one lung to the other, the results of the deaths are included, and thus the whole number of cases is brought into use. We find that, excluding 325 patients which had disease of both lungs, and 80 of whom the results at last visit are unknown, 585 had one lung only attacked at first visit; of these the disease spread to the other lung in 131 instances, or in 32 per cent. Of those in the first stage, the disease extended to the other lung in 85 cases; of those in the second, in 24; of those in the third, in 81. These numbers indicate that, after a certain period, the disease has less tendency to spread, and is likely to remain limited to one lung. As regards the relative tendency of the two lungs, the right seems rather more liable to extension than the left, and this greater liability exists in whatever stage of disease the left lung may be.

The results of the changes in the lungs may be summed up as follows :

A cure was effected in $4\frac{1}{2}$ per cent. of the cases; great improvement in 38 per cent.; the disease did not increase in $13\frac{1}{2}$ per cent., but in $43\frac{1}{2}$ per cent. there was more or less increase.

The right lung was attacked more frequently than the left, but the left, when attacked, was more prone to softening and excavation.

Where the disease extended from one lung to the other, the right lung was more liable than the left to such extension.

Duration of life.—We have now reached the most important part of our subject. What did these patients die of? How long did they live? What effect had the various conditions under which they lived on their span of years? One hundred and ninety-eight patients are recorded to have died, and the greater part of these succumbed to the gradual waste and decay of phthisis; 15 died from phthisical complications, viz. 4 of profuse hæmoptysis; 3 of pneumo-

thorax ; 1 of empyema ; 1 of ulceration of the intestine ; 2 of diarrhœa ; 1 of diarrhœa and hæmoptysis ; 1 of diarrhœa and dropsy ; 2 of dropsy arising from contraction of the lungs ; 12 were carried off by other diseases, viz.—

- 1 by disease of the stomach ;
- 3 by disease of the brain ;
- 2 by heart disease ;
- 1 by kidney disease ;
- 4 by pneumonia ;
- 1 by throat disease (not phthisical).

The *average* duration of life from the commencement of the disease in the patients who have died was 7 years 8·72 months, and was thus composed :

8 lived 1 year and under 2					} 71 lived from 1 to 5 years.
22	„	2	„	3	
18	„	3	„	4	
23	„	4	„	5	
75	„	5	„	10	
31	„	10	„	15	
12	„	15	„	20	
9	„	20	to	30	

198

Of 21 patients who survived their first attack from 15 to 28 years—

2 lived 15 years.			3 lived 21 years.		
2	„	16	„	1	„ 22
6	„	17	„	2	„ 24
1	„	18	„	1	„ 26
1	„	19	„	2	„ 28

The chronicity of these cases is very remarkable, and it may be noted that 64 per cent. lived 5 years and upwards, while only 36 per cent. lived less than that period. In the

above list the greatest number is included under "5 to 10 years." Taking the duration of life by stages, in 106 of the first stage the average duration was 7 years 11·8 months (nearly 8 years).

In 49 of the second stage, 8 years 0·4 months.

In 43 of the third stage, 6 years 8·3 months.

What results do we obtain from the 802 patients who were alive when last heard of? The *average* duration of life in these has been 8 years 2·19 months, a somewhat higher duration than among the deaths (which were probably the worst cases), and one which, considering the still favorable state of many of the patients, bids fair to increase further.

The average was thus composed :

71	have lived	1 year and less than 2		
97	"	2 years	"	} 332 lived 1 to 5 years.
96	"	8 "	"	
68	"	4 "	"	
224	from	5 "	to	10
124	"	10 "	"	15
54	"	15 "	"	20
65	"	20 "	"	30
8	"	30 and upwards.		

This table shows that 332, or 41·4 per cent., have lived from 1 to 5 years, and that 470, or 58·6 per cent., have already lived 5 years and upwards. The class of 10 to 30 years' duration is a large one, forming 30 per cent. of the whole, and affords remarkable evidence of the chronicity of the disease. Still more remarkable is the fact of as many as 68 patients having lived 20 years and upwards, of whom 2 have lived more than 30 and one 47 years, and the distribution of these it is worth our while to note further.

11	have lived	20 years.	10	have lived	24 years.
7	"	21 "	3	"	25 "
13	"	22 "	2	"	26 "
12	"	23 "	3	"	27 "

3 have lived 28 years.	1 has lived 33 years.
1 has lived 29 „	1 „ 36 „
	1 „ 47 „

Total 68

The question naturally arises as to the state of the 812 living patients at last report. Were they complete invalids, lingering out a miserable existence? Or was their health sufficiently good to permit of their returning to the duties, if not to the pleasures, of life? Observation on this point leads us to divide the patients into three classes.

1st. Those who have apparently quite recovered their general health, and are able to follow their occupations without any recurrence of their former symptoms. These we describe as *well*.

2ndly. Those who are able to follow their occupations more or less actively, but, owing to their being subject to a return of their symptoms, are obliged to use precautions. These we designate *tolerably well*.

3rdly. Those who are obliged to devote themselves entirely to the care of their health are described as *invalid*.

The "well" class numbered 285, or 35·53 per cent.; the "tolerably well," 293, or 36·53; and the "worse," 224, or 28 per cent. The first two classes, therefore, comprise 72 per cent. of the whole, and show a great preponderance over the "invalid" class, which is only 28 per cent. This is noteworthy, and proves what reparative power nature puts forth, if only the time is allowed for her to do so. In considering the patients we must remember that, though their social status exempted them from absolute want, it by no means exempted them from exposure to other injurious influences. Among these patients were men of every profession—members of parliament, officers in the army and navy, clergymen, practitioners of law and medicine, men of business, &c., and they were, therefore, liable to the dangers consequent on each calling—exposure to great varieties of temperature, from which military and naval men

suffer ; or close confinement in hot rooms and occasional pressure of work, the lot of many professional and business men ; or, again, the strain on the lungs which public speaking entails on members of parliament, clergymen, barristers, public lecturers, and the like. When we remember these facts it must be considered highly satisfactory that so large a majority are found in the "well" and "tolerably well" classes.

The greater part of the "well" class could not be distinguished in ordinary life from healthy persons, and many are sufficiently strong to undertake exertion of an arduous kind, whether physical, like long walks and mountain ascents, or mental, like close application to study or business.

Having duly described the duration of life in these cases, it will be well to advert to the estimates formed by different authorities of the duration of phthisis. Laennec gives twenty-four months as the mean duration ; Andral the same, Louis and Bayle twenty-three months, founded on the examination of 314 cases.

The first Brompton Hospital Report, in 215 fatal cases, found that 41·14 per cent. died less than one year after attack, 45·82 per cent. between one and four years after, and 6·5 per cent. had a duration of more than four years, the rest being of doubtful duration.

Dr. Fuller,¹ in 118 cases investigated by himself at St. George's Hospital, found that by far the greater number died from three to eighteen months after first attack, whereas in 46 cases in his private practice he found the usual duration varied from one and a half to seven years ; and he remarks that this discrepancy cannot be wholly explained by the social position of the sufferers and the advantages the latter enjoyed with respect to medical treatment, change of air, and proper regimen. He accounts for it by the greater care with which the upper and more educated classes are wont to watch their health and note the earliest inroads of disease.

¹ Op. cit.

Dr. Pollock,¹ in his valuable work, which has contributed more than any other to our knowledge of the prognostics of consumption, gives from two and three quarters to three years as the average duration of 129 cases ending in death. These occurred among 3566 hospital patients, the rest of whom at the end of two and a half years were living and in a state of health favorable to the expectation of life for a considerable term.

It will be seen that there is a very great difference of estimate among these authors, which can only be explained by a difference either in the nature of the cases or in the mode of life and method of treatment adopted.

Louis's and Laennec's cases seem to have been chiefly of an acute form, treated either in the old way by bleeding, antimony, &c., or on the expectant method. It has been urged that a more acute form of disease is prevalent in France, but there is no proof of this; and from what I saw of French consumptive patients when residing in the south of France, I should say that there was no material difference in the nature of the cases, but a very great difference in their hygienic and medicinal treatment, which went far to explain to my mind the rather large mortality noted among them. The estimate of the first Brompton Hospital Report refers to deaths occurring amongst the in-patients, and these, owing to their having to wait so long before admission, are exceptionally bad cases. Some died within a week after admission.

Dr. Pollock's statistics are taken from the broader and very extensive set of cases which the out-patient department at Brompton furnishes. These may be said to embrace all classes below the wealthy one, and, what is more to the purpose, all varieties and degrees of the disease; the fortnightly visit to Brompton not, as a rule, interfering with the necessities of occupations or home cares, and thus securing the attendance of a large number who could not afford to become in-patients, while at the same time information as to the state of those who are not able to

¹ Op. cit.

attend is given through a form of note supplied to the patients at the hospital, or else by a letter from the relatives. When viewed in relation to the few deaths and the expectation of life for the survivors, Dr. Pollock's statistics give the most favorable results for the lower classes ever published.

The results of Dr. Fuller's 46 private cases are of great interest as bearing on our own. The patients belonged to the same class of society, and only included 3 deaths under one year's duration. The average, too, viz. $1\frac{1}{2}$ years to 7 years, is higher than any of the hospital results above mentioned, and more in accordance with those given in these pages.

The average duration of life of the 1000 cases treated of in this paper far exceeds any estimate yet formed, but we must remember that, owing to the limitations mentioned at the commencement, it is the average of *chronic* consumption. The restriction of being *one year at least under observation*, though satisfactory for accuracy, practically excludes acute cases terminating fatally; such cases are comparatively rare, and acute cases recovering are not excluded.

The long duration may be attributed to—

1st. The early detection of the disease, two thirds of the patients being in the first stage when they came under observation.

2ndly. The perseverance with which they carried out the various healing measures at their disposal, whether medicinal, hygienic, or climatic.

An attempt has been made to arrive at the relative duration of some of the forms of phthisis, as of those arising from bronchitis and pneumonia, but it has not been thought advisable to make many divisions of the cases until the opinion of the profession is more decided as to the advisability of further divisions. Every day's observation among the in-patients and the far more numerous out-patients of the Brompton Hospital convinces me that the varieties of consumption merge imperceptibly into one another, and that it is impossible to draw a hard and fast line between them. How can we lay down a strict rule as to what cases are tubercular and what are not?—or, again, as to the time when

a case of chronic catarrhal pneumonia becomes tubercular? Niemeyer admits that "the development of tuberculosis in lungs which are already consumptive, as a result of inflammatory action, sometimes takes place in a manner so latent as to make it extremely difficult, if not impossible, to recognise the fact with certainty." In truth, the word "tubercle," though it may be said to mean something pathological, cannot at present lay claim to have much clinical value, and it is to be hoped that its use will be restricted to a very limited class of patients.

Influence of sex and age on duration.—Let us now direct our attention to the influence of sex and age on the duration of life, and to demonstrate these points tables are drawn up (Tables III, IV, and V), the results of which will be now stated.

TABLE III.—*Showing Influence of Age of Attack on Duration in 198 Deaths.*

Age when attacked.	Males.	Duration.		Females.	Duration.		Total.	Duration.	
		yrs.	m.		yrs.	m.		yrs.	m.
Under 10 years ...	2	16—	11·	1	7—	0·	3	*13—	7·
10 to 20 „ ...	15	6—	6·	19	6—	6·47	34	6—	6·23
20 to 30 „ ...	40	8—	9·12	35	6—	6·97	75	7—	4·28
30 to 40 „ ...	36	8—	11·13	15	6—	10·06	51	8—	3·76
40 to 50 „ ...	15	8—	2·20	3	6—	10·	18	*7—	11·5
50 to 60 „ ...	8	8—	0·12	2	6—	4·	10	*7—	8·1
60 and upwards	3	2—	11·66	4	8—	5·25	7	*6—	1·14
	119			79			198		

* Number too small to yield fair average.

Average Age of Attack in 198 Deaths.

Males 31·54 years.
Females 27·75 „

Average Duration.

Males 8 years 4·72 months.
Females 6 „ 8·67 „

TABLE IV.—*Showing Age at Death of 198 Patients.*

Age at death.	Males.	Females.	Total.
Under 10 years	0	0	0
10 to 20 „	6	7	13
20 to 30 „	19	32	51
30 to 40 „	38	17	55
40 to 50 „	28	14	42
50 to 60 „	19	4	23
60 to 70 „	8	1	9
70 to 80 „	1	4	5

Average of Age at Death in 198 Cases.

Males 39·93 years.

Females 34·48 „

TABLE V.—*Showing Ages at latest Report of 802 Living Patients.*

	Males.	Females.	Total.
Under 10 years	1	0	1
10 to 20 „	18	18	36
20 to 30 „	120	110	230
30 to 40 „	165	91	256
40 to 50 „	116	53	169
50 to 60 „	65	18	83
60 to 70 „	17	4	21
70 to 80 „	3	2	5
80 to 90 „	1	0	1
	506	296	802

	Years.	No. of cases.
Average age of attack in living males	29·08	506
" dead	31·54	119
Total number of males	29·47	625
Average age of attack in living females	25·61	296
" dead	27·75	79
Total number of females.....	26·06	375
	Yrs. Mo.	
Average duration in living males	8—6·85	506
" " females	7—7·97	296
	Years.	
Average age at last report in living males	37·55	506
" " females	33·27	296

According to these, *sex* exercises a very decided influence on duration. Among the deaths the average duration of the males was 8 years 4·72 months; of the females, 6 years 8·67 months; showing a difference of more than $1\frac{1}{4}$ year in favour of the former. We see, therefore, that the females survived the disease, on an average, for a shorter period than the males, and it has been already shown that they were attacked earlier, so we naturally expect that they died at a less advanced age. The results of the table accord with this expectation, for we find that the average age reached by males was 39·98, *i. e.* about 40 years, and that by females 34·48, or $34\frac{1}{4}$ years, showing the females to be shorter lived than the males by $5\frac{1}{4}$ years. It should be remarked that the age of attack among the 198 deaths is slightly more advanced than among those living, being in the ratio of 31·54 to 29·98 among the males, and of 27·75 to 26 among the females, but no deduction can be drawn from this beyond that it shows how difficult it is to deal in statistics with the deaths and the living indiscriminately. Taking the deaths alone, we find that the age at the time of attack, exercises some influence on the duration of the disease, and that there was a greater tendency in both sexes towards longer duration the later in life they were attacked. This feature was more marked in the males

than in the females, *e. g.* of those attacked in the decade from 10 to 20, the duration is the same for both sexes, but of those attacked between 20 and 30 the duration for the males is 8 years 9 months, and for the females 6 years 7 months, a difference of more than two years, and the result is much the same in the decade from 30 to 40. The numbers in the other decades are too small to warrant us in drawing conclusions concerning them. The ages reached by some of the patients were remarkable. About half the males and 29 per cent. of the females survived 40 years. Eight males and five females survived 60, and one male and four females 70, the majority of the males dying between 30 and 40, and of the females between 20 and 30.

The ages of the living patients present less interest, as the average is, and must be, a changing quantity, becoming greater as the years roll on and as the deaths increase in number; still it may be as well to mention it. Among the males it was 37·55 years, among the females 33·27 years. The particulars show that 21 per cent. were between 40 and 50, 13 per cent. between 50 and 60, 21 per cent. between 60 and 70, 5 per cent. between 70 and 80, and 1 over 80.

The results of the influence of age and sex on the duration of these cases may be thus summed up :

The later the time of attack, the longer was the duration, the retarding influence of age being more conspicuous among the males than among the females, and especially so between the ages of 20 and 50.

Among the females the time of attack was, on an average—

1stly. Four years earlier than among the males.

2ndly. The duration of the disease was $1\frac{1}{2}$ years shorter.

3rdly. The age reached was $5\frac{1}{2}$ years less.

Influence of family predisposition on duration.—Family predisposition is so common among cases of phthisis that its connection with the disease has often been regarded as that of cause and effect, and it has been rather a custom than otherwise to hunt out the hereditary predisposition and

to trace the disease to that source. As every day shows that many instances of consumption originate in inflammatory and other attacks, where no hereditary predisposition can be traced, the value of this influence as a cause of phthisis diminishes as other influences rise in importance. In this paper we are not concerned with the connection of predisposition with the origin of phthisis, but rather with its influence on the duration; it being highly desirable to ascertain whether or not patients in whom predisposition exists, have a worse chance of life than others in whom it is absent. For this purpose an attempt has been made to answer the following questions:

1st. Does family predisposition shorten the duration of phthisis?

2nd. Does it quicken the onset of the disease?

3rd. Which sex is most affected by it?

4th. What degrees of relationship exercise the greatest influence on the disease?

The number of cases in which family predisposition was traced was, as stated above, 484, or 48·4, including 397 living and 87 dead. The annexed table shows that the average duration among the 87 deaths was 7 years 5·8 months, an average

TABLE VI.—*Comparison of Duration of Life of those affected and those not affected with Family Predisposition.*

		No. of deaths.
Average of cases affected with family predisposition...	Yrs. Mos. 7— 5·8	87
" " unaffected " "	7—10·9	111
" total number of cases.....	7— 8·7	198

not greatly differing from that of the cases free from this influence, or from that of the total deaths. This shows only a difference of a few months, and certainly does not indicate that family predisposition exercised any decided

influence in shortening the duration of the disease. The evidence of the 397 living cases supports the same conclusion, for among these the average already reached was 7 years 11 months, that of the cases free from predisposing taint being 8 years 7·25 months, and that of the total living being 8 years 2 months. It would seem, therefore, that family predisposition exercises but a slight influence over the duration.

Does it quicken the onset of the disease? What influence has it on the age of attack? Our results on this question are seen below.

Influence of Family Predisposition on Age of Attack.

		No. of patients.
Average age of attack of total number of males	29·47	625
" " of males affected with family predisposition.....	27·07	270
" " of total number of females ...	26·06	375
" " of females affected with family predisposition.....	21·51	214

Here family predisposition would seem to exercise a great influence in precipitating the onset of the disease, for the males thus predisposed were attacked two years earlier than the others, and the females four and a half years earlier, and thus family predisposition, though it does not materially shorten the duration of the disease, may tend to shorten the duration of life, for these patients, being attacked earlier, and the duration about the same in both cases, they will naturally die at an earlier age than those who are attacked somewhat later in life.

Which sex is most affected by family predisposition? It is decidedly more common among females than males, existing in 57 per cent. of the former, and only in 43 per cent. of the latter.

TABLE VII.—*Relative Duration of Life of Sexes in Family Predisposition.*

	No.	Dead.	No.	Living.
		yr. mo.		yr. mo.
Males	54	8—2	216	8—2·7
Females	33	6—7·3	181	7—6·7
Total	87		397	

The sexes are equally influenced as to duration, but as to the age of attack the females are more decidedly influenced than the males.

What degrees of relationship exercise the greatest influence on the disease? It must be confessed the numbers at our disposal, and especially the number of deaths, are too small to admit of a satisfactory answer to this question. For this reason, the evidence furnished by the exhibited table is of a negative kind, and can only be relied on as proving that some forms of predisposition do not curtail the duration of the disease, and not as showing what influence other forms may have on it.

TABLE VIII.—*Influence of different degrees of Family Predisposition on Duration of Life.*

	Dead.	No.	Living.	No.	Total.
	Average. yr. mo.		Average. yr. mo.		
Grandparents affected ...	*16—7·00	2	*10—6·62	8	10
Father	*7—5·28	7	7—9·25	36	43
Mother	8—3·54	11	7—10·75	56	67
Both parents .....	...	1	*6—9·11	9	10
Brothers and sisters ...	7—6·02	44	8—2·24	180	224
Uncles and aunts	*12—6·00	4	7—6·18	44	48

* Numbers too small to yield fair average.

We see that in 11 deaths where the mothers were consumptive the duration was 8 years $3\frac{1}{2}$ months, and that 56 living patients similarly situated had lived 7 years 10·75 months. Among these few cases maternal influence had no effect in curtailing the duration, but, indeed, among the 11 deaths the average was slightly higher than ordinarily. In the case of brothers and sisters, where the numbers warrant our speaking more decidedly, what do we find? In 44 deaths the average duration was 7 years 6 months, slightly below the whole average of deaths, while of 108 living cases in this category the mean duration was 8 years 2·24 months, about the same as the common average. Here, again, the family predisposition seems to have exercised little or no influence. The other numbers are too small to admit of even negative evidence.

Our conclusions as to the effect of family predisposition on duration are—

1st. That it does not directly limit the duration of the disease.

2ndly. That it precipitates the onset of the disease, and thus shortens the duration of life.

3rdly. That it affects females more than males.

Influence of origin on duration.—It has been stated that 149 of the cases originated in attacks of pleuro-pneumonia, from which the patients recovered with lungs more or less crippled by adhesions, by consolidations, or by both. Did these patients live a longer or a shorter time than the average? Among 29 who have died the mean duration was 9 years $6\frac{3}{4}$ months, and 120 who still survive have on an average lived $9\frac{1}{4}$ years, thus exhibiting an extension of life beyond the ordinary of nearly two years for cases having an inflammatory origin. In 64 of these cases hereditary taint was traced, but it is not worth while to consider the duration of these separately, as the number of deaths is small, and it has been already demonstrated that family predisposition exercises no curtailing influence over the duration of the disease.

To further investigate the influence of the inflammatory origin on the duration of consumption, at Dr. Burdon Sanderson's suggestion I selected a small number of cases which exhibited the inflammatory origin most strongly, and were entirely free from any suspicion of family predisposition. Not only was the disease directly traceable to the pneumonic or pleuro-pneumonic attack, but in every case lesions, more or less extensive, the results of such attacks, remained behind, and were easily detected by the physical signs.

The duration of these cases confirms still more strongly the conclusion that inflammatory origin has a prolonging influence over the duration of phthisis.

Among 10 patients who have died, the average duration was 12 years 10 months.

Among 20 who still survive it is 11 years 8½ months.

Our conclusion, therefore, is, that phthisis originating from pneumonic or pleuro-pneumonic attacks of the lungs has a longer duration than when originating from other causes.

With regard to the influence of the origin from bronchitis on the duration of phthisis, our cases, and especially the fatal ones, are at present too few to warrant our drawing decided conclusions.

THREE CASES
OF
INJURY TO THE BRAIN.
WITH
AN APPENDIX OF CASES.

BY
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Received Dec. 18th, 1870.—Read Feb. 14th, 1871.

IN this communication I propose to direct attention, first, to the frequency with which convulsions or rigidity are associated with paralysis of the left side of the body as compared with that of the right; secondly, to the occurrence of these symptoms in cases of injury or disease of those parts of the right cerebral hemisphere which lie above the corpus striatum.

IN two communications to 'St. Bartholomew's Hospital Reports' I have related cases in which various convulsive seizures were associated with disease of the membranes of the brain, and especially with disease about the course of the middle cerebral arteries.¹ These vessels are surrounded by the chief branches, within the cranium, of the vaso-motor nerves, and irritation of these is not unlikely to affect the

¹ Vols. iii and v.

calibre of the vessels supplying the brain, and, consequently, the circulation through its tissue. That any such irritation may so influence the nerve tissue as to shock it into allowing or producing purposeless movements in the muscular system is by no means improbable.¹ The curious fact that of all aneurisms of the brain arteries those of the middle cerebral seem especially to give rise to convulsions tends to corroborate this assumption.²

It is further clear that a sudden escape of blood into the ventricles or into the cerebral tissue may occasion a passing convulsion, from the shock suddenly inflicted on the brain; but of such hæmorrhages I pointed out that those connected with left-side paralysis and with injury to the right hemisphere, external to the optic thalamus and corpus striatum, were, in an exceptional manner, followed by convulsions, and that this held good also for disease, as distinguished from the laceration produced by hæmorrhage, of the same parts of the cerebrum.

Collecting from the papers referred to the cases of disease or injury to any one portion of the substance of the encephalon, excluding, that is to say, the surface and the ventricles, in which one side of the body was, as a consequence, in part or entirely paralysed, I obtain the following results :

Right-side paralysis	.	.	.	.	8 cases.
Convulsions in	.	.	.	.	1 case.
Left-side paralysis	.	.	.	.	15 cases.
Convulsions in	.	.	.	.	7 cases.

The case of right-side paralysis with convulsions was one of abscess involving the posterior lobe of the left cerebral hemisphere, and the convulsions were probably due to pressure on the opposite (right) hemisphere. Speaking generally, the symptoms attending abscess or tumour of the brain are

¹ Lecat and Wickard wrote of spasm of the nerves and arteries of the brain as "apoplexia convulsiva."

² Op. cit., vol. iii, p. 426. Dr. Hughlings Jackson has referred to the same interesting fact. See 'London Hospital Reports,' vol. i, 1864; and 'A Study of Convulsions,' p. 37.

most perplexing, but we have evidence in support of this proposition. Thus, I have recorded a case¹ of abscess in the left hemisphere with convulsions, caused probably by pressure on the opposite side, as the patient suffered from left hemiplegia; and Dr. Church has figured² a brain section showing the effect produced by a tumour in the left hemisphere on the substance of the opposite (right) mantle, which is reduced one third in width, and in this case convulsion seems to have been the most marked symptom caused by the compression of tissue.

In eight cases of left-side paralysis not followed by convulsions the corpus striatum, optic thalamus, and the pons, were the parts affected. The tissue outside these, which is in proximity to the middle cerebral artery, and which contains the great branches of this artery dividing to be distributed through the hemisphere, and forming in this region a great vascular zone, was the part injured in the cases attended with convulsions.

What the precise nature or seat of the derangement may be which so affects the brain tissue as to give rise to the symptoms known as convulsions, it is certainly not very easy to determine; but I now propose to advance further data, which, if no precise deduction can be drawn from them, will at least introduce a subject of interesting speculation.

Since my attention was drawn to this subject in making an analysis of the cases which had been examined by the late Dr. Kirkes or by myself at St. Bartholomew's Hospital, several instances have come to my knowledge pointing to some part of the right hemisphere as being thus especially connected with the occurrence of convulsions. I saw, for example, a case of apoplexy of which I was told that the patient had right-side paralysis, with convulsions affecting chiefly the left side of the body. But on examining the patient more carefully, the medical gentleman in attendance found that the left side was the one paralysed, the patient having some power over the right, so that the arm, when

¹ 'St. Bartholomew's Hospital Reports,' vol. iii, Case 48.

² Op. cit., vol. v, p. 208.

raised, was kept in that position, or was moved towards the face. This second examination was made in my presence, because I raised the question as to which side was paralysed in connection with the occurrence of the convulsions. Some time ago there was a sailor in Darker Ward, under the care of Mr. Paget, for a history of whose case I am indebted to Mr. Bloxam, one of our surgical registrars.

CASE 1.—T. L.—, æt. 27, sailor. Admitted March 8th, 1870, died March 17, 1870.

History.—December 3rd, 1863, about six years ago, at New York (having been previously in robust health), he received a blow on the right side of his head, which fractured his skull. Whilst under treatment for this injury in the Bellevue Hospital matter formed under the right parietal bone, and one month after the original hurt he was trephined, and about three quarters of an ounce of pus escaped. After this operation he is said to have remained insensible for two months, and subsequently to have lost his sight.

Three months and eleven days after the injury he suffered from his first convulsive seizure, and after recovering from this his left arm was paralysed, and his left leg was weak. During the next two or three months he had repeated convulsive seizures at intervals of about fourteen days, and then for about two months he appears to have been comparatively free from their recurrence.

In August, 1864, the parietal bone was dead, and Mr. Paget removed a portion of the skull, six inches by three and a half,¹ having a circular opening about its middle. Shortly after, within three weeks, the fits returned. Thus far he had been only partially paralysed, but after an injury on March 3rd, 1866, he lost all power over the left side, and from this date the fits ceased to trouble him. (I may here mention that about this time he had been under the care of Dr. Hughlings Jackson, at the Hospital for the Epileptic and

¹ The vault of the skull is in the museum of St. Bartholomew's Hospital. The part which necrosed consisted of the right parietal and the adjacent side of the frontal bone.

Paralysed.) The convulsions which have been referred to seemed to begin in the left hand and arm, and then extended to the entire side, and almost immediately to the right.

One week before his admission, whilst drunk, he fell on his head, and the next morning he found a swelling on the right side of the skull, which had since steadily increased in size.

Condition when admitted.—On the right side of his head, about the centre of the parietal region of the corresponding side, was a hernia cerebri about the size of a small orange, soft and pulsating, and narrowing towards the opening through which it protruded. A quantity of clear fluid drained away from around it. He was restless and irritable, but he replied to questions, although his speech was not very distinct. At night-time and during the day he wandered, continually talking. His pulse was rapid, and, after a severe rigor on March 11th, his temperature rose to 101.2° . He was blind with the left, but had slight vision with the right eye. The left-side paralysis persisted, but there were no convulsions.

After recurrence of the rigors he became more restless and noisy, so that he had to be removed to a separate room; he gradually grew insensible and died.

Post-mortem.—There were no changes worth referring to, with the exception of those which involved the contents of the skull. The arachnoid and pia mater were thickened about the margins of the opening through which a portion of brain had protruded, and where bone was deficient these membranes and the dura mater adhered to scalp and scar tissue. At the base there was thickening of the visceral arachnoid and of the pia mater about the course of the basilar and internal carotid arteries, and, speaking generally, in all that space included by the circle of Willis. This thickening, evidently the result of long-passed effusion, was sufficient to involve and compress the optic commissure and the optic nerves within the skull. It did not extend along the course of the middle cerebral branches.

The upper portion of the right hemisphere,¹ from which the hernia extruded, was softened to the level of the corpus callosum. This softening, in places amounting to fluidity of the brain tissue, extended through the entire width of the mantle, and in front reached to within one inch of the anterior extremity, whilst behind it was two and a half inches from its posterior limit. Below the level of the corpus callosum it was traced into the island of Reil, and also through the corpus striatum to the right cerebral peduncle. Lastly, the arachnoid generally was the seat of recent inflammation with some effusion of lymph.

In this very interesting case the following appears to me to be the explanation of the varying symptoms. First, the man suffered from meningitis, intensified in the right parietal region, whence the pus was let out by trephining. The post-mortem showed the thickening of tissue which resulted from this inflammation, the chief effect of which was by subsequent contraction to cause compression of the optic commissure and nerves. Secondly, the brain tissue, where it had been damaged by compression from the collection of pus, became gradually disorganized, and during this disintegration the period characterised by the occurrence of convulsions belonged and the left-side paralysis was incomplete. Thirdly, after a further injury in 1866 the left-side paralysis became confirmed, and the disease now extended from the outlying fibres to the corpus striatum, and, the root of the fibres being thus involved, and the whole system of the hemisphere being shut off from its connection with the structures below the crus cerebri, the convulsions abruptly ceased. Fourthly, the immediate cause of death was the rupture of the scar tissue leading to the hernia cerebri, and causing general inflammation of the membranes of the brain.

There have recently been under Mr. Paget's care in Kenton Ward two cases which he is so good as to allow me to report,

¹ This, with the adherent scalp, is in the museum of St. Bartholomew's Hospital.

both of which I saw with him whilst they were under treatment, and respecting which, from the attendant symptoms, I ventured to diagnose that the brain was injured about the right middle lobe in some part external to the corpus striatum, and in either instance the diagnosis was confirmed by the post-mortem examination.

CASE 2.—This and the following case are taken in part from notes by Mr. Bloxam.

J. S—, æt. 35, admitted December 1st, 1869, died December 5th, 1869.

History.—He had sustained an injury to the head by falling from a van. He was found insensible in the roadway and was removed to a police station, then to a workhouse, thence to his house, and at last, the following morning, to the hospital.

Condition.—He was insensible, moaning as he lay; the pupils were contracted; pulse 100; lower extremities lax and occasionally moved, chiefly the right one; upper extremities rigid. There was a wound on the left side of the head leading to the pericranium just behind the ear. There was no bleeding from either meatus auditorius.

Progress.—After the first twelve hours he began to have twitchings of the left arm and leg, but in other respects his condition remained as at first. On the fourth day, being on duty for Mr. Paget, I found him still insensible, but on calling loudly he seemed to hear and moved his head restlessly. The pulse had fallen to 76, and the respirations were now 34 in the minute and rather stertorous. The lower extremities were lax, and the right was moved occasionally, but the left was affected by sudden jerks, which recurred at short intervals of time. The upper extremities were rigid, each arm and forearm being flexed; the fingers were bent on the palms of the hands, and extension was resisted. As we watched him these extremities were repeatedly convulsed, the rigidity becoming more intense and then relaxing with a series of little shocks, but at no time did the arm become completely extended. There were no twitchings about the

face and no evidence there of paralysis. He gradually sank and died at 2 p.m.

Post-mortem.—Besides a fracture extending from the left side through the base of the skull, without depression, there was some blood between the dura mater and the bone in the left middle fossa, but not in quantity sufficient to cause material pressure on the brain. The surface of the brain, the pia mater, and the arachnoid, were apparently free from injury, except about the lowermost part of the right middle lobe, where a small quantity of blood lay over the brain surface, and thence into the substance of the brain, for a depth of nearly an inch, the tissue was largely lacerated by hæmorrhage, the disintegration spreading out over a space in this lobe about one inch and a half in diameter.

CASE 3.—J. P—, æt. 33, admitted December 28th, 1869, died January 4th, 1870.

History.—This man, whilst intoxicated, fell off his box and injured his head.

Condition.—When brought to the hospital he was insensible and blood was escaping from the left ear and from the nostrils. His breathing was laboured, but from this condition he presently rallied, when he could move all his limbs, was restless, and kept constantly getting out of his bed. His pulse was 72.

Progress.—He remained much in this condition, answering all questions and taking the food offered to him until the morning of the 31st of December, when the restlessness increased, and he was found to have lost the power of movement in the left arm, and after this he seemed to become somewhat drowsy, although he was still easily roused.

On the morning of January 1st, at 3 a.m., he had a series of fits with convulsions, occurring one after another, with intervals of about one hour. In these the left side was more violently convulsed than the right, and the body was arched towards the left. After the convulsion the patient sweated profusely. The pulse remained in the intervals between the

fits at 72, and there was still power of movement in the left leg.

He became more restless, and the convulsions recurred more often and lasted longer; in other respects he remained much the same until January 3rd. When I then saw him in several of his convulsive attacks the seizure commenced on the left side but almost immediately involved the right. The jaw was fixed, but the muscles of the face generally were spasmodically moved. The entire body was drawn to the left. The fits commenced with a rigidity of the muscles; the eye, for example, was drawn to the right side. The rigid muscles then relaxed, and the eye floated towards the left, and was then suddenly jerked many times in succession to the right side until, when the fit passed off, both eyes were turned towards the left. As I have elsewhere observed of similar cases, the pupils during these attacks remained fixed midway between contraction and dilatation. The pulse rose to 130, but in the intervals subsided to 72, when he sweated profusely. He then answered questions readily and took the food offered to him. There was no reflex action on the left side, but on irritating the sole of the right foot a fit immediately recurred. As time passed by, the convulsions ceased to involve the right, with the exception of the face, and were limited to the left side of the body.

The fits became more and more frequent, but he was yet sensible on the afternoon of the 4th, and would take nourishment, but his pulse rose to 120, he became greatly exhausted, and after a rapid succession of convulsions he died at 9 p.m. He seemed to retain some power over the left foot almost to the last.

Post-mortem.—The left side was less rigid than the right, and many of the muscles were marked with blood extravasations. There were some small ecchymoses on the surface of the right hemisphere, and there was also a fracture at the base of the skull. On examining the substance of the brain, injury to its tissue was found to be limited to the right middle lobe. In this, which is in the museum of the hospital, there were several lacerations caused by extravasation

of blood, one in the lowest part extending to the surface behind the Sylvian fissure, and others more deeply in its tissue but external to the corpus striatum. Of these the largest measured $\cdot 7$ of an inch by $\cdot 5$, and had a depth of about one inch. The tissue about them was pink and softened.

I had the opportunity of seeing this patient during life, and took occasion to express an opinion as to the seat of the injury to the brain, which in this case, besides causing a partial hemiplegia, was also associated with convulsive seizures.

In relating these cases I have referred to the middle lobe of the brain as the part affected. This, although a conventional, is, of course, an artificial reference. If examined at an early period of growth, at the fourteenth week of foetal life, this region includes the fissure of Silvius, which is then

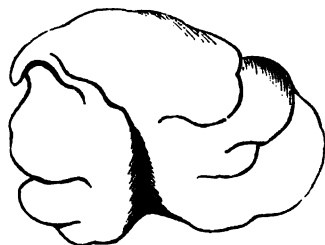


FIG. 1.—Diagram of foetal brain about fourteenth week, showing the nearly vertical direction of the fissure of Sylvius and the relation of the so-called posterior lobe.

nearly vertical,¹ the corpus striatum and all the fibres passing through this peduncle of the mantle. But as the brain grows by unfolding of its tissue, and as the Sylvian fissure loses its vertical direction, the most posterior part of the hemisphere is brought by a half twist of the peduncle (corpus striatum) into the middle region of the mantle (see figs. 1 and 2), which contains, therefore, in its lowest portion

¹ See "Description of a Foetal Brain" in the 'Journal of Anatomy and Physiology,' May, 1870.

the folds of hemisphere originally the most posterior, in its middle the twisted peduncle, and, converging on this, the fibres from all parts of the mantle, including those which pass to the opposite hemisphere in the corpus callosum. It is

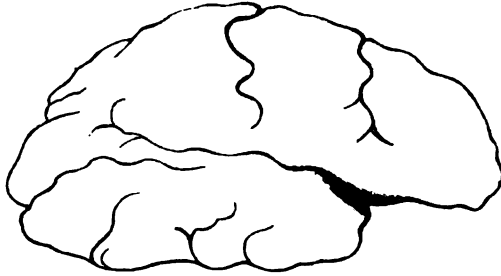


FIG. 2.—Diagram of adult brain, showing the antero-posterior direction of the fissure of Sylvius and the altered position of the posterior lobe, which is twisted downwards and forwards.

not even desirable to describe the hemisphere as consisting of an anterior and posterior lobe, lest any such division should lead to misconception of the fact that the entire mantle, its covering of gray matter perhaps excluded, is but the unfolding of the fibres of the peduncle, most comparable to the unfolding of a fan, with no division to mark the beginning or the ending of separate lobes.

As an appendix to these observations I have arranged in Tables I and II cases of side paralysis from the works of Bouillaud, Abercrombie, and Andral, and, as more recent illustrations, I am enabled by the kindness of the Medical Officers of St. George's Hospital to add from their register cases recorded from 1859 to 1868, both years inclusive. For convenience of reference these cases are also figured (Table III) on an outline map of the brain.¹

¹ Dr. Hughlings Jackson has been so kind as to draw my attention to an observation by Dr. Sieveking respecting the great frequency with which convulsions seem to affect the left side. "The convulsions that ensue are more or less violent, and generally show a preponderance on one side of the body. . . . It has appeared to me that the left side is the one most frequently affected."—Sieveking on 'Epilepsy,' 2nd edit., p. 5.

In these tables all the cases are placed which conform to the following conditions :—Age, above 19 years ; membranes of brain free from disease ; brain tissue diseased or injured on one side only ; paralysis distinctly marked.

When added to those already referred to, these cases give—

Cases of side paralysis	109
Cases in which rigidity or convulsions occur .	46
Cases of right-side paralysis	48
Cases in which rigidity or convulsions occur .	7
Cases of left-side paralysis	61
Cases in which rigidity or convulsions occur .	39

When examined with reference to the parts of the hemispheres involved in the disease or injury, we have the following results :

Cases in which parts above the corpora striata are affected :

Left side	37 cases.
Convulsions or rigidity in	7 „
Right side	47 „
Convulsions or rigidity in	39 „

Cases in which the corpora striata, including the optic thalami, are affected :

Left side	11 cases.
Convulsions or rigidity in	0 „
Right side	18 ¹ „
Convulsions or rigidity in	0 „

In some few (six) cases, in which the corpus striatum and the parts outside it happen to be diseased together, the history of the case has been relied upon to determine whether the disease should be regarded as extending from above into the peduncle or whether the corpus striatum was the part first affected.

Amongst Andral's cases, ' *Observations relatives à des*

¹ One case of disease of the pons Varolii not included.

cas où le Trouble du Mouvement a été le seul Symptom,' all which are given in this and in the next chapter are examples of disease of the right side of the brain, although in two of the twelve there is also a history of disease of the left side as well. Two of these cases, not included in the tables, are briefly as follows:—(1) A man, *æt.* 56, had right-side paralysis, but neither contractions nor convulsions; later he became violently agitated on the left side, the left arm passed into a state of rigidity like that of tetanus, and then the left side became paralysed. There was a great extent of softening in the left hemisphere; in the right the middle of the corpus striatum was the seat of limited ramollissement. (2) A man, *æt.* 30, suffered from rigidity, and later from alternate attacks of left-side paralysis and of convulsions, the paralysis becoming gradually confirmed. There was softening at the middle of the right optic thalamus. These cases are excluded from the tables because in the first both hemispheres were diseased, and in the second there was softening of the "voûte à trois piliers."

A case (p. 649) of right-side disease with rigidity is also excluded because no distinct mention of paralysis is made; the upper half of the right hemisphere was hard ("caracteres du squirrhe").

Of the seven cases of rigidity or convulsions with right-side paralysis one has been already referred to, and Cases 1 and 2, Bouillaud's—are also instances of cerebral abscess. (3) Andral.—The symptoms were not well marked. The patient is described as agitated, and contraction was limited to the little and ring fingers of the right hand. (4) Andral.—The patient had been ill three years, and had had paralysis four months. He had only one convulsive seizure, and that one immediately before death. (5) Abercrombie.—The side paralysis had lasted six months without convulsion or rigidity, when the patient was attacked with convulsions and died in nine hours. (6) Abercrombie.—The entire left hemisphere was like a bag of purulent matter.

TABLE I.—*Cases of Right-side Paralysis.*

No.	Rigidity	Convulsions.	No convulsions.	Seat of Disease.	Reference.
1	R.	...	...	Middle internal lobe, abscess	Bouillaud, Obs. 20.
2	...	C.	...	Junction of anterior and middle lobes, abscess.	" Obs. 30.
3	R.	C.	...	Softening of middle lobe	Andral, tom. v, p. 493.
4	...	C.	...	Cancer of optic thalamus, corpus striatum, and outside these	" tom. v, p. 646.
5	...	C.	...	Softening of middle lobe	Abercrombie, Case 32.
6	...	C.	...	Softening, purulent, of all hemisphere; clot in optic thalamus	" Case 38.
7	N. C.	Softening of middle lobe	Bouillaud, Obs. 25.
8	N. C.	Abscess in and softening of middle and posterior lobes	" Obs. 33.
9	N. C.	Sort of tumour in anterior lobe, softening of middle lobe	" Obs. 36.
10	N. C.	Tumour pressing on and causing softening of anterior lobe	" Obs. 37.
11	N. C.	Side and anterior lobe, tumour	" Obs. 38.
12	N. C.	Posterior and middle lobes, cancer	" Obs. 44.
13	N. C.	Corpus striatum, optic thalamus, and parts outside these	St. Geo. Hosp. Reg., 1859, No. 102.
14	N. C.	Softening of hemisphere	" 1860, No. 14.
15	N. C.	Softening of hemisphere	" No. 94.
16	N. C.	Clot involving all hemisphere	" 1861, No. 145.
17	N. C.	Cancer in middle lobe	" 1863, No. 229.
18	N. C.	Softening of hemisphere, embolism	" 1864, No. 254.
19	N. C.	Clot in corpus striatum	" 1865, No. 41.
20	N. C.	Clot in corpus striatum	" 1866, No. 346.
21	N. C.	Softening of third frontal convolution	" No. 346.
22	N. C.	Softening of middle lobe	" 1867, No. 90.
23	N. C.	Softening of middle lobe, embolism	" No. 254.
24	N. C.	Clot in anterior and middle lobes	" 1868, No. 159.
25	N. C.	Cancer in posterior lobe	" No. 213.
26	N. C.	Clot in anterior lobe	Andral, tom. v, p. 813.
27	N. C.	Clot in posterior lobe	" p. 816.
28	N. C.	Clot in posterior lobe	" p. 819.
29	N. C.	Clot in middle lobe	" p. 822.
30	N. C.	Cyst in cerebral peduncle	" p. 839.
31	N. C.	Softening of corpus striatum	" p. 458.

TABLE II.—*Cases of Left-side Paralysis.*

	2	4	34	
32	N. C.	Softening of hemisphere..... left
33	N. C.	Softening of corpus striatum..... left
34	N. C.	Softening of hemisphere..... left
35	N. C.	Softening of corpus striatum..... left
36	N. C.	Cyst in hemisphere outside ventricle..... left
37	N. C.	Cyst in hemisphere outside ventricle..... left
38	N. C.	Softening of upper part of hemisphere, with clot..... left
39	N. C.	Softening of anterior part of hemisphere..... left
40	N. C.	Induration and softening of parts of hemisphere..... left
Totals				
1	N. C.	Clot in corpus striatum..... right
2	N. C.	Clot in corpus striatum..... right
3	N. C.	Clot in optic thalamus..... right
4	N. C.	Softening of corpus striatum and optic thalamus, and outside these..... right
5	N. C.	Softening of corpus striatum and optic thalamus, and outside these..... right
6	N. C.	Softening of corpus striatum and optic thalamus, and largely outside these..... right
7 ¹	N. C.	Cyst in middle lobe..... right
8 ²	N. C.	Softening of middle lobe..... right
9	N. C.	All hemisphere..... right
10	N. C.	Tumour in posterior lobe..... right
11 ³	N. C.	Clot in middle lobe..... right
12	N. C.	Posterior lobe above level of corpus callosum..... right
13 ⁴	N. C.	Cancer outside corpus striatum and optic thalamus..... right
14 ⁵	N. C.	Slight softening in middle of centrum ovale..... right
15	R.	...	...	Clot outside corpus striatum and optic thalamus..... right

¹ The paralysis was confirmed two years before this man came under observation.

² To the history of this patient the note is added "Not seen by registrar."

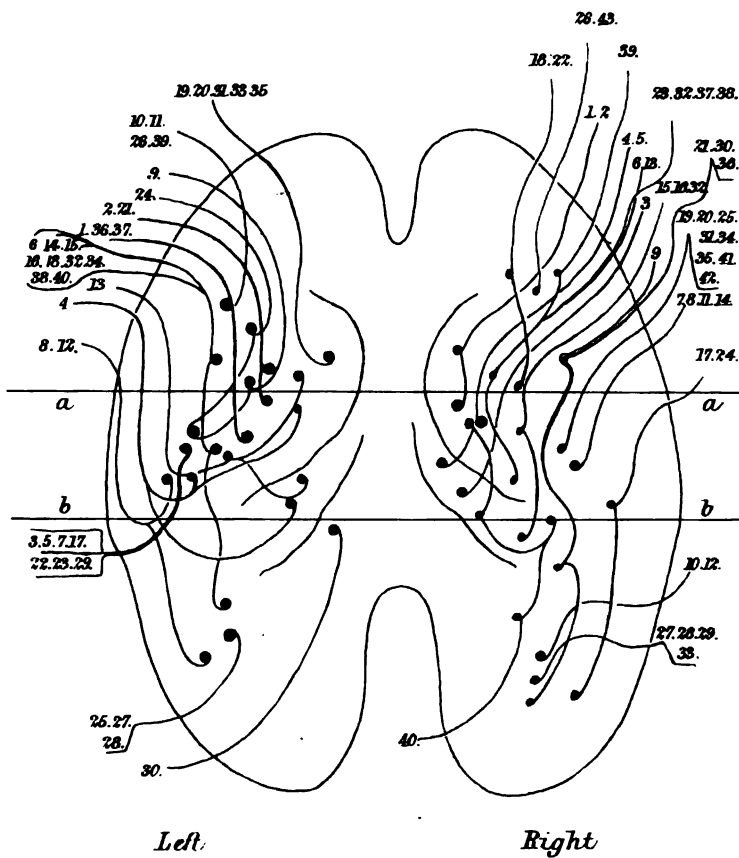
³ This case, first described by Andral, is also quoted at length by Abercrombie. Progress slow, duration fifteen years.

⁴ The softened portion was of small extent, "the size of a nut."

⁵ This patient was aged eighteen years.

No.	Rigidity.	Con- vul- sions.	No con- vulsions.	Seat of Disease.	Reference.
16	R.	..	...	Softening and suppuration outside optic thalamus	Bouillaud, Obs. 14.
17	R.	..	...	Clot in posterior and middle lobes	" Obs. 45.
18	R.	..	...	Abscess in anterior lobe from corpus striatum forwards	St. Geo. Hosp. Reg., 1860, No. 170.
19	R.	..	...	Tumour in lower part of middle lobe	" " p. 325.
20	R.	..	...	Clot in lower part of middle lobe	Andral, tom. v, p. 404.
21	R.	..	...	Softening of hemisphere, corpus striatum, and optic thalamus, right	" " p. 406.
22	R.	..	...	Softening at union of anterior and middle lobes	" " p. 410.
23 ¹	R.	..	...	Softening of corpus striatum, optic thalamus, and parts around, right	" " p. 413.
24	R.	..	...	Softening of posterior and middle lobes	" " p. 413.
25	R.	C.	...	Clot in middle lobe, extending into corpus striatum	Bouillaud, Obs. 12.
26 ²	..	C.	...	Abscess in anterior lobe	" Obs. 29.
27	..	C.	...	Abscess in posterior lobe	" Obs. 28.
28	..	C.	...	Abscess in posterior lobe	" Obs. 31.
29	..	C.	...	Abscess in posterior lobe	" Obs. 32.
30	..	C.	...	Cancer in posterior, middle, and part of anterior lobes	" Obs. 42.
31	..	C.	...	Tumour in middle lobe	St. Geo. Hosp. Reg., 1859, No. 202.
32	..	C.	...	Outside ventricle, extending into corpus striatum	" " 1860, No. 116.
33	..	C.	...	Clot in posterior lobe	" " 1862, No. 33.
34	..	C.	...	Softening of front part of middle lobe	" " 1863, No. 2.
35	..	C.	...	Middle of hemisphere	" " 1865, No. 1.
36	..	C.	...	Pus in hemisphere	" " 1867, No. 302.
37	..	C.	...	Clot outside corpus striatum and optic thalamus	Andral, tom. v, p. 343.
38	..	C.	...	Softening outside, below, and behind corpus striatum	" " p. 445.
39	..	C.	...	Anterior lobe, corpus striatum, and optic thalamus, softening, right	" " p. 449.
40	..	C.	...	Post. and mid. lobes, corp. striat., and optic thal., softening	" " p. 510.
41	..	C.	...	Cyst in upper part of hemisphere, and second cyst below this	Abercrombie, Case 132.
42	..	C.	...	Tubercle in middle lobe	" Case 86.
43	R.	..	...	Softening of anterior lobe	" Case 35.
Totals			11	18	29
			14		

¹ In the original there is an error as to the side paralysed.² In the original the heading is printed in error "abscess enkysté de l'hémisphère gauche"?



ON
NEURITIS OF THE BRACHIAL PLEXUS.

BY
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Received Dec. 13th, 1870.—Read Feb. 28th, 1871.

THE pathology of peripheral paralysis is still involved in so much obscurity, and its treatment so frequently unsatisfactory, that I venture to hope the following contribution to the same may be thought worthy of the attention of the Fellows of this Society.

The case which forms the groundwork of the following communication is that of D. D—, a girl, æt. 16, who was admitted into the infirmary for epilepsy and paralysis under my care, on July 18th, 1870, with paralysis of the right upper extremity. She had been in very good health before the present affection came on. She first menstruated at the age of 15, and had continued pretty regular ever since. In April last she suddenly began to complain of pain and numbness in the right hand and arm; the next few days she experienced a loss of power in those parts; the fingers appeared white, and the skin peeled off. The weakness of the muscles gradually became more marked, and in about ten days from the commencement of the affection she had completely lost the use of the whole upper extremity. She now attended as an out-patient at one of the London hospi-

tals, where she was treated with bromide and iodide of potassium, nux vomica, belladonna, and, later on, with the syrup of iodide of iron and cod-liver oil. For the relief of the pain, liniments of aconite and chloroform, subcutaneous injections of morphine, chloral, and a blister to the neck, were used, and Faradisation was resorted to daily for a month in order to relieve the lost power; yet (to use the words of the physician under whose care she was, and who has kindly given me these particulars) "she only got worse from first to last;" and she was then sent to the infirmary, where she was admitted under my care.

On examining the patient, it appeared that there was complete paralysis of motion and sensation of the whole upper extremity, no voluntary movements of the arm and shoulder being possible, and no touch, pricking, pinching, or any other mechanical irritation being in the least degree perceived by the patient. The muscles of the arm were not wasted, and the temperature of the limb was not lower than that of the left arm. Faradisation of the skin, and of the nerves and muscles of the shoulder and arm, likewise proved ineffectual; but when I applied a powerful continuous current of Daniell's battery to the arm, the patient exclaimed that she felt sensations of heat, pricking and tingling in the arm and fingers; and the muscles, more especially the flexor muscles of the fingers, responded to the current by sluggish, yet plainly perceptible contractions. Any lesser galvanic power than sixty cells of the battery did not produce any effect, while under ordinary circumstances a current of twenty cells causes not only decided sensations of heat and tingling, but also muscular motion.

The curious fact that under certain circumstances one form of electricity will produce an effect on a paralysed limb, while another form of it will prove absolutely ineffectual, was first pointed out ten years ago by Baierlacher, of Nuremberg; and has since then been experimentally studied by Erb, Ziemssen, and other observers. It appears from these investigations that as far as such alterations of excitability are concerned, nerves and muscles obey totally different laws; that soon after

an injury to a nerve has taken place, either by mechanical violence, or by rheumatic, gouty or syphilitic effusions, the excitability of the nerves appears to be completely destroyed, not only to the induced but also the continuous current; while the muscles lose their excitability only to the induced and not to the continuous current. The important practical conclusion to be deduced from these facts is that it is of no use to treat cases of this kind with the handy little machines furnishing an interrupted current, as this has no influence on nerves and muscles thus affected, but that the continuous galvanic current alone should be resorted to for their cure.

In the present case I gave no medicine whatever. The patient had already been treated therapeutically by a very able physician, who had used all the remedies upon which we look with most confidence in the management of such affections, yet the result had been absolutely *nil*. On the other hand, the general health of the patient was so good that no medicines were required on account of that. All that was done was, therefore, a systematic daily application of the continuous current to the suffering extremity for about five minutes each time. The result of this treatment has been most satisfactory. After four applications sensation returned in the paralysed limb, so that the patient was again able to perceive touch, pricking, pinching, &c., just as well as before the commencement of the affection. The paralysis of motion proved more stubborn; but after seven applications the girl was able to move her fingers. The treatment was continued for another fortnight, at the end of which the patient could not only move all her fingers, but also flex and extend the wrist. I then discharged her, as I was anxious to see whether she would continue to improve on the treatment being suspended, or whether she would remain in the same condition. It might have been said that a process of natural cure had set in; that the progress the patient had made was synchronous with, but not owing to, the galvanic treatment; in fact, that the good results hitherto obtained were not *propter hoc*, but *post hoc*.

Six weeks after her discharge the patient presented

herself again at the infirmary, and it was then found that she was absolutely in the same condition as when she had left it. She had not gone back in the interval, but she had made no progress whatever, the arm and shoulder being just as useless as before. The supposition of a natural process of cure could not, therefore, be entertained ; and as the patient and her parents were very anxious that the treatment should be resumed, she was readmitted on September 27th. The use of the continuous current was now recommenced, with the result that in a very few days a further decided improvement took place ; the patient soon became able to move the hand, arm, and shoulder in all directions, and to grasp things with some force. She was, however, not discharged until the power of the right arm was in all respects quite equal to what it had been previous to the commencement of the affection. The recovery of power went on steadily from the periphery to the centre, the fingers being the first and the shoulder-blade the last to regain it. The patient was sent home on November 28th perfectly recovered.

The present case raises some interesting questions in diagnosis. What was the actual nature and seat of the paralyzing lesion in this patient ? Was it a case of cerebral, spinal, or peripheral paralysis ? Could it be due to hysteria, lead-poisoning, or other causes which we know to produce palsy of motion and sensation ? These questions I shall now proceed to consider.

Cerebral paralysis is extremely rare in persons of the age of our patient ; it generally comes on quite suddenly, not gradually, as in the present case, where the invasion of the complaint was protracted over ten days. Again, cerebral paralysis almost always affects one side of the body, the face and the leg as well as the arm, while in this case the cerebral nerves and the lower extremity did not at all suffer. Cerebral paralysis is only very rarely accompanied with complete anæsthesia ; for most patients suffering from it, although they may be completely deprived of the power of motion, retain sensation in a more or less considerable degree. All these

circumstances, taken collectively, speak strongly against the cerebral origin of the palsy; but one more remains to be mentioned, which puts the matter completely at rest, and this is, that in *cerebral paralysis*, whatever may be the extent of the loss of voluntary power, the nerves and muscles always retain their excitability to Faradisation; and in those cases where there is any inflammatory irritation in the brain, the paralysed muscles answer even more powerfully to the Faradic current than those of the healthy limb—a fact to which the late Dr. Todd was the first to direct attention. There is no exception to this rule; and the absence of Faradic excitability in the present case was quite sufficient to make us reject the idea that in our patient the brain was the seat of the paralysing lesion.

Was it then a case of *spinal paralysis*? To this question we may also return a negative answer; for if there had been disease of the upper portion of the spinal cord or its meninges sufficiently severe to cause total paralysis and anæsthesia of the whole upper extremity, the intercostal muscles and the lower extremity would have participated in the affection. Another circumstance which speaks against the supposition of spinal paralysis is that in the earlier stages of such an affection the muscles do not lose their excitability to Faradisation.

Paralysis occurs sometimes in consequence of pathological changes which have taken place in the *cervical sympathetic nerve*; but in cases of that class, which are very rare, there are always considerable alterations to be noticed in the nutrition of the face, viz., increased vascularity of the skin, heat and hyperæsthesia of the same, constriction of the pupil, protrusion of the eye-ball, &c., all of which were absent in the present case.

Nor could the paralysis in this instance have been due to *lead-poisoning*. There was no evidence to show that this girl had ever been exposed to the injurious influence of lead; there was no blue line on the gums; she had never suffered from colics or obstinate constipation; and what is even more important the general aspect of the palsy in her case was

entirely different from that which occurs under the influence of lead. In lead-palsy both arms are affected, the right one generally more than the left; and it is almost exclusively the extensor muscles of the hand and forearm which suffer, while the flexors either escape completely, or only become weakened to a moderate degree.

Whenever lead-palsy is severe, there is great deformity of the forearm, the back of which is hollowed by atrophy of the extensors, while the wrist drops. In the present case, however, although the paralysis was complete, the arm retained its shape and plumpness; there was not one particular set of muscles which suffered more than another, but all the muscles of the whole extremity were indiscriminately affected.

Some recent authors have affirmed that there is no such thing as *hysterical paralysis*; but their clinical experience must have been very limited. Cases of hysterical paralysis without any structural lesions whatever are, indeed, by no means rare, but the present case was certainly not one of hysterical paralysis. The girl had never shown any symptoms of hysteria; moreover the invasion of hysterical palsy is quite different from that which was observed in this case, as it almost always comes on quite suddenly, after a violent mental emotion, while in this case the progress of the loss of power was protracted over the space of ten days. Hysterical paralysis almost always affects either the vocal cords or the lower extremities, giving rise to aphonia and paraplegia, and only very rarely occurs in the upper extremity. This girl, however, had never lost her voice nor been unable to walk. Moreover, in hysterical paralysis, the motor nerves and muscles retain their excitability to Faradisation for years after the commencement of the affection, while in this case it was lost within a few weeks from the beginning of it.

Paralysis occurs sometimes in consequence of *disease of the urinary organs*; but this is always confined to the lower extremities, which have never suffered in our patient. Moreover, the urinary organs were and always had been in perfect health in the present instance.

The question might now be asked whether the case was one of nervous or muscular disease? This admits of a ready answer. The fact that not only motive power but also sensation was completely annihilated, speaks sufficiently for some part of the nervous system being in fault; moreover, there is no muscular affection which takes away motive power without at the same time altering the bulk of the extremity. In Cruveilhier's disease or wasting palsy the degree of paralysis is always proportionate to the extent of muscular atrophy that is present; while in Meryon's or Duchenne's disease the paralysis corresponds to the degree of muscular hypertrophy which is noticed. In the present case the bulk of the suffering limb was exactly the same as that of the healthy limb.

The last question we have to consider as far as diagnosis is concerned is, whether the girl was *malinger*ing? It is well known that girls, especially of the age of this patient, are given to deceitful practices in order to excite wonder and interest, and that they will continue the deceit for months and even years (*e. g.* the Welsh fasting girl). But this question is likewise disposed of by the results of the electrical examination. Malingerers may have sufficient control over themselves to bear, without flinching, severe pain, as produced by pricking, pinching, or burning; but it would be absolutely impossible for them to resist the influence of an induced current of high tension in making their muscles contract. This influence is irresistible where the nerves and muscles are in a healthy condition, and the question of shamming may therefore be dismissed.

After excluding all the various affections which we have been considering, we are led to the result that the affection must have been due to a pathological lesion of the anterior branches of the four lower cervical nerves, which form the *brachial or axillary plexus*. This plexus imparts motive and sentient power to the whole upper extremity; it animates the rhomboid muscles, the serratus anticus, the supra and infra-spinatus, the subscapularis, the anterior portion of the latissimus dorsi, and all the flexors and extensors, pronators and supinators of the

arm and hand. Not one of these muscles had escaped the paralyzing influence, while muscles in their immediate neighbourhood, which are animated by different sets of nerves had remained in perfect condition. Thus for instance the trapezius and the sterno-cleido-mastoid muscles were in no way impaired, for the motion of the head, forwards, backwards, and laterally, had always been quite easy; nor did the *cervical plexus*, formed of the anterior divisions of the four upper cervical nerves, suffer; for there had never been the least interference with respiration, showing that the phrenic nerve, which arises from this plexus and animates the diaphragm, had escaped the paralyzing influence. Moreover, the skin of the back of the head, the neck, and the ear has never lost its sensibility—a circumstance which excluded an affection of the sentient branches given off by the cervical plexus, which animate the skin of the parts just mentioned. On the other hand, the skin of the arm, from the acromion downwards, was totally anæsthetic, while the sensation on the shoulder-blade was blunt although not quite gone. That the skin of the shoulder-blade should have preserved a certain amount of sensibility is easily explained by the circumstance that it receives sensitive influence, not only from branches of the brachial, but also from such of the cervical plexus which, as we have already seen, did not participate in the disease.

It would be difficult to determine in which point of its transit the brachial plexus was diseased. When I examined the patient there was no thickening or tenderness perceptible anywhere in its superficial course, which could have led me to fix upon the precise seat of the pathological lesion; but as not one of the motor or sentient branches of the whole plexus had escaped the paralyzing influence, the seat of the disease must have been at some point of the plexus before its entrance into the axilla.

It now remains to determine the nature of the pathological lesion which had affected the brachial plexus. We may at once exclude injury to, and tumour pressing upon, the plexus, of neither of which was there any history or evidence. Inflammations affecting the plexus, may be of a syphilitic,

gouty or rheumatic character; and as there were no symptoms of syphilis or gout in the patient, we are led to the conclusion that the case was one of *rheumatic neuritis of the brachial plexus*.

Whether such a disease with its sequelæ may be influenced by any purely medicinal treatment is extremely doubtful. The patient had, before she came under my care, been treated for more than two months, by a very able physician, with those remedies which we look upon with most confidence in the management of such affections; yet there was no improvement whatever. The disease, however, yielded readily to a judicious application of the continuous galvanic current. Sensation, after having been completely lost for about four months, returned within a few days from the commencement of this treatment. Motion was recovered more slowly, but steadily, and in exact proportion as the galvanic treatment was continued. The fact that no improvement whatever took place during the six weeks which the patient spent at home, between the two periods of her stay in the hospital, while she immediately improved each time the galvanic treatment was resorted to, is sufficient to prove that the recovery was not due to the unaided efforts of nature, but was really owing to the influence of the particular plan of treatment which was adopted.

The precise mode of action of the continuous current in cases like the forgoing is not yet fully understood. It appears, however, probable that its effects are of a complex nature; and it is only one of them with regard to which we may speak with absolute certainty. This is, that the application of the current may prevent granular disintegration and atrophy of the paralysed muscles by making them contract. The experiments of Dr. John Reid have shown that muscles which are separated from the influence of the nerve-centres, will, if frequently caused to contract, preserve their nutrition much longer and more thoroughly than those which remain quiescent. The induced current cannot prevent atrophy of the muscles in cases like the one I have related, because it is unable to make them contract. It is, therefore,

a great boon that we possess, in the continuous current, an agent which will, if properly applied, cause muscular contractions under any circumstances as long as the muscles have not utterly lost their normal structure.

But this is evidently not the only beneficial effect which galvanisation produced in the present case. We have seen that, by its means, sensation was within a few days restored to its normal condition. It is, therefore, evident that the current re-established the conductivity of the sentient fibres of the brachial plexus, which was completely lost previous to its application. The current must have done the same thing, although more slowly, with the motor branches of the plexus, since the mere causation of muscular contractions, although useful for preventing muscular atrophy, could never have restored that nervous influence to the muscles which enables them in the normal condition to respond to the orders of volition. It is, therefore, necessary to assume that the current contributed to the removal of the rheumatic effusion, which pressed upon the plexus and thereby rendered it unable to fulfil its function. By effecting dilatation of the blood-vessels of the affected parts, the current obviously enabled them to take up and remove into the general circulation, pathological effusions which by their presence impeded the conveyance of the nervous influence to the distal parts of the nervous district. Whether there was in the present case actual destruction of nervous matter, such as occurs through mechanical injury or tumours and whether galvanisation promoted or accelerated its regeneration, it would be difficult to determine. But looking at the rapidity with which sensation was re-established, it seems more rational to assume that the inflammation, although sufficiently severe to cause entire loss of function, had not proceeded to absolute destruction of the nervous matter, but had caused effectual compression of the same, which was removed by the catalytic effects of the continuous current setting free the nervous force, which had been rendered inactive through interrupted conduction.

ON

SPORADIC CRETINISM, OCCURRING IN
ENGLAND.

BY

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Received Feb. 7th.—Read Feb. 28th, 1871.

SOME years ago Dr. Hugh Norris, of South Petherton in Somersetshire, showed that in a neighbouring village, Chiselborough, there prevailed endemically a disease analogous to the cretinism of Alpine countries, and, like it, frequently associated with goitre and deaf-mutism.¹ From a communication with which I have been favoured by Dr. Norris it appears that "the cretins in Chiselborough have now almost died out. Improved sanitary measures, better food, better education, and greater contact with the outer world, together with fewer intermarriages," appear to have combined in eradicating the disease. Scattered examples of it, however, are still occasionally to be met with in the part

¹ "Notice of a remarkable disease, analogous to Cretinism, existing in a small village in the West of England." 'The Medical Times,' 1847, xvii, p. 257.

of Somersetshire in which Dr. Norris resides. In his letter to me he speaks of having recently had an opportunity of examining a "boy or man of a thoroughly cretinous type, the son of a very intelligent but very goitrous mother, and of a father (a respectable tradesman) of a type tending to cretinism." He is also "cognizant of another case some eight miles from Chiselborough where two children were cretins, the mother being well formed and intelligent but goitrous, the father having made at least more than one step towards the cretin type."

I am not aware that in any other part of Great Britain a similar form of degeneration has been observed within a recent period to prevail endemically. Many years ago Dr. Reid¹ stated that cretinism associated with goitre existed in the Isle of Arran. I have not been able to learn that its presence in that island has since been noted.

Some years ago a boy, *æt.* 14, was admitted into the York County Hospital who had a large bronchocele, and was of stunted growth and deficient in intelligence.² His parents had resided all their lives in York; none of his relations were known to have been idiots, nor to have suffered from goitre.

Now it would seem that this case fairly deserved to be termed one of sporadic cretinism; and as certain foreign writers on the subject have admitted the existence of such a form of the disease, it might appear that there was nothing unusual about the case.

In reality, however, this case is the only one on record (so far as I can ascertain) in which cretinism has occurred sporadically, in association with goitre. The writers to whom I have just referred have contented themselves with a simple mention of sporadic cretinism, and have nowhere given accounts of any cases of the kind.

Thus, I have been in doubt whether these writers have

¹ 'Edinburgh Medical and Surgical Journal,' xlv, p. 47.

² 'Medical Times and Gazette,' 1855, ii, p. 266. An account of this case is also given in the 'Manual of Psychological Medicine,' by Drs. Bucknill and Tuke, 2nd edit., p. 100, 1862.

not rather had in their minds another and apparently a less rare affection, which in some important respects differs from ordinary cretinism, but which has received that name from at least one English observer.

In this affection no enlargement of the thyroid body occurs; and it presents other peculiarities, to which I desire to draw the attention of the Fellows of the Royal Medical and Chirurgical Society.

I also believe that I can advance an hypothesis by which the discrepancies between ordinary cretinism and this peculiar form of the disease can be accounted for. If my hypothesis be accepted, the name of sporadic cretinism will be very applicable to the latter affection. But if this be regarded as essentially of a different nature from endemic cretinism, it ought rather to receive a distinct appellation.

Provisionally, however, I will use the term "sporadic cretinism" for the disease which I am about to describe: and I will now relate as briefly as possible certain cases of it which have recently been under my observation.

CASE 1.—Idiocy with stunting of body and cretinous type of face (? congenital); no goitre; soft movable tumour on each side of neck outside sterno-mastoid muscle. (See Plate II, fig. 1.)

(For the notes of this case I am indebted to Mr. ERNEST EVANS and Mr. C. J. OLDHAM, successively House Surgeons to the Evelina Hospital for Sick Children.)

Edward D—, æt. 8, was admitted into the Evelina Hospital for Sick Children under the care of Dr. Fagge, Nov. 26th, 1870, having previously been an outpatient of Dr. E. B. Baxter's.

The boy's father and mother are healthy; they live in a roomy house at Rotherhithe; they are sober and regular in their habits; the most careful inquiry fails to elicit a history of habitual or even occasional intemperance in either parent. Their other children are healthy.

At birth the child was large, and forceps were employed in his mother's delivery.

He began to cut his teeth at two years, and first attempted to walk when three years and a half old. During early infancy it was not noticed that anything was wrong with the child; but after a time his mother observed that he would sit down whenever he could, and often remained silent in one position for hours together. He also ceased to grow; his mother does not think that he has grown since he was two years and a half old.

At the present time, although eight years of age, he seems more like a child two or three years old. He is, however, particularly quiet, sitting still in whatever place he may be put, and rarely moving of his own accord. An air of torpid contentment generally characterises him. Sometimes his face will light up with a slow smile. Now that he has become accustomed to the hospital ward he always smiles when notice is taken of him, and he will at any time smile stupidly when told to do so. He says very little, and appears not to know many words; but he will name correctly things shown to him. He is said to be passionate, but such explosions of temper occur but rarely; and he is a great favourite with the nurses and attendants. He is clean in his habits.

The boy's height is now 2 feet 7 $\frac{1}{4}$ inches; he weighs 25 lbs.

His appearance will probably be indicated by no description so well as by the plate taken from a photograph which accompanies this paper (see Plate II; fig. 1). The head is large and round; the face is broad; the eyes are wide apart, being separated by the broad flat root of the nose; the tip of the nose is flattened and upturned, and the openings of the nostrils are rounded; the mouth is large and generally open, but there is little or no flow of saliva; the lips are thick; he has all his first set of teeth; the tongue is of natural size.

On either side of the neck, just above the clavicle, is a soft, movable, inelastic swelling. This can be drawn downwards across the clavicle to some extent, and appears to be connected with the subcutaneous rather than with the deeper tissues.

No prolongation of it can be discovered in the axilla. It has been thought that kneading causes it to disappear for a time. On application of the stethoscope a very distinct respiratory murmur is heard over each swelling.

There is no goitre, and no indication of the presence of a thyroid body can be felt in front of the trachea.

The chest is well formed; the limbs are short and thick; the tibiæ are somewhat curved, but there is no rickety enlargement of the epiphyses; the hands and fingers are very broad, short, and thick, as are also the feet and toes.

The skin all over the body, but not that of the face, is harsh, and presents scattered, small, hard scales of a light brownish-grey colour. The hair and eyelashes are long, dark, and abundant.

CASE 2.—*Stunting of body, with change of features a cretinous type, dating only from an attack of measles (?) at eight years of age; no goitre; soft tumours in both supra-clavicular fossæ; mental faculties unimpaired; age of patient 16½ years (see Plate II, fig. 2).*

(Notes given to Mr. J. LACEY MORLEY by patient and her elder sister.)

Kate —, æt. 16½, came as an out-patient to Guy's Hospital under the care of Dr. Fagge, and was subsequently admitted into Mary ward under Dr. Wilks.

Her parents are in good circumstances, her father being station-master at an important railway station about twenty miles from London. She has three brothers and one sister, all of whom are well grown.

Until she was eight years old she was a good-looking child, with a large quantity of black hair. She was lively and good tempered, and played like other children. She went to school at four years of age, and made satisfactory progress.

When six years old she had "a slight attack of measles," but did not keep her bed. About the same time she had hooping cough. Two years afterwards she had "a second

attack of measles." She then kept her bed for two weeks; she was not insensible. She is further stated to have had erysipelas at that time. Sores followed on the head, and she lost her hair in patches. She suffered from severe diarrhoea and also from shortness of breath.

Whatever may have been the precise nature of this illness, it appears beyond doubt to have been the starting point of a remarkable alteration in her physical development. Her relations and friends concur in stating that she has not grown in height since that time, and that her features have undergone a complete change. Two or three weeks afterwards the hair grew dry and crisp; and whereas it was black, it acquired in places a golden colour. From that time it has remained extremely scanty and short.

Her present appearance is perhaps indicated by the accompanying photographs better than by any description. (See Plate II, fig. 2.) She measures four feet one inch in height.

The head is round and well formed, appearing small rather than large in proportion to the size of the body; the forehead is not projecting; the eyes are small, the eyelashes short; the pupils dilated and sluggish; the root of the nose is much flattened; the tip of the nose is wide and upturned; the alæ are thick; the mouth is large; the lips are thick; the cheeks are plump and firm; the complexion is pale and unhealthy looking; the ears are small, even for her size, but very well shapen.

The neck is rather short, but not thick. On each side, outside the sterno-mastoid muscle, is a doughy soft swelling. These swellings are movable to a considerable extent, they can be drawn down over the clavicles, and seem, as it were, to disappear when kneaded. They are not very definitely circumscribed, and yet they seem to be lobulated. On auscultation a respiratory murmur can be heard over them. It has, therefore, been supposed that they contain the apices of the lungs; but it is by no means certain that the respiratory murmur is more distinct than it normally is in the same regions.

These swellings were first noticed four years ago: first that on the right side, and two or three weeks later the left one.

They are about the size of hen's eggs, the right one rather the larger. They overlies the sternal half of the clavicle on both sides.

There is no goitre, nor can any part of the thyroid gland be felt in front of the trachea.

When she first came to Dr. Fagge it was on account of the extremely scurfy state of the head, amounting, indeed, to a condition of pityriasis. The hair was then sparse, of a light colour, dry and short. The appearance of the scalp was, in fact, very like that which is sometimes left by favus after its cure, quite unlike that left permanently by any ordinary eczematous or scaly eruption. Under appropriate treatment, however, the hair has become quite thick and of fair length.

There was also a scaly eruption scattered over the shoulders and back, resembling an eczema squamosum rather than a psoriasis. This also has been greatly improved by local treatment.

The limbs are small, but perfectly well formed. The bones are straight, and their extremities are of natural size. They present no indication of a past rachitic state. The muscles of the limbs and of the body generally are well-developed and very firm. The hands and feet are of about the size of those of a child six or seven years old; kid gloves of No. 4 size are rather too large for her hands.

Her mental faculties are very good. She appears to be very intelligent; she is not nervous or shy, and converses freely. She is, however, said to be of a reserved character; she is very fond of reading all kinds of books, but has a weakness for novels. She does not care for music.

Her voice is like that of a child, but is squeaky, and rather disagreeable.

The catamenia first appeared when she was fifteen years old, and have been regular ever since. The mammæ appear to be as much developed as is usual in girls of her age.

She does not enjoy good general health; she is subject to colds. Her breath is often offensive. Her extremities are apt to be cold, and she is fond of sitting over the fire with a book.

The heart-sounds are normal; the pulse is 78, small and feeble.

CASE 3.—A. B—, *set.* 20 years (see Plate II, fig. 3), has been in an idiot asylum ten years. His height, when he was admitted, was 2 feet 4 inches; it is now 2 feet 7½ inches. His weight with his clothes on was 1st. 9½lbs.; it is now 2st. 5lbs.

He is affectionate, placid, and quiet. He sleeps well. He has not the power of speech.

His senses are natural. He can walk only by clinging to the furniture.

His countenance is pallid, and his features are cretin-like in an extreme degree. There is no goitre, and no indication of the thyroid body can be felt in front of the trachea. The swellings above the clavicles are present, but are not of any great size. He is constantly dirty and wet, and makes no signs as to his wants. The skin of his hands and legs looks as if too large for him.

A sister is said to be affected in the same way as he is.

CASE 4.—C. D—, *set.* 12, recently admitted into an idiot asylum (see Plate II, fig. 4).

Her mother died of hepatitis; her father is healthy. They were not connected by consanguinity. No other child is affected.

The girl's condition is congenital, and is attributed to the mother having been frightened, when pregnant, by the sudden death of a neighbour.

Her height is 3 feet 10½ inches; her weight is 4st. 3lbs. Her complexion is sallow; her features are cretinous. The tumours above the clavicles are well marked; the width of the forehead is 4½ inches; the hands are short and broad. The skin is harsh and dry.

She is deaf and dumb, but is very affectionate, cheerful, and happy. She can say *a, b*; she can drill, and she helps to dress the other children; she is afraid of dogs; she is not mischievous, nor noisy, nor spiteful; she has a good memory;

she sleeps well; she has had no epileptic fits; she uses a knife and fork a little at her meals.

In proof that the peculiar type of conformation exhibited in these four cases is not very common, I may state that the Asylum at Earlswood contained only two examples of it when I recently had an opportunity of visiting that institution. The cases in question were kindly shown to me by Dr. Grabham, and form two of the four cases on which this paper is based. Each of them presented the peculiar cretinous configuration in a marked degree. It may be added that, according to the officials and nurses, of whom I made particular inquiry in reference to this point, no other children with similar features had recently been inmates of the asylum. No conditions intermediate between that of the two patients above described and ordinary idiocy were to be found. So far as I could learn, common idiots never present the peculiar supra-clavicular swellings, the existence of which appears to be a constant feature in sporadic cretinism.

Another case, very similar in all its characters to those above related, was exhibited to the Pathological Society, in the year 1869, by Dr. Langdon Down.¹ The subject of it was a female child, *æt.* 5, who measured only 22 inches in height, could only stand with the help of a chair, and gave utterance merely to a few monosyllabic sounds. The hair was sparse and coarse; the tongue was large; and there was a "venous tumour" on each side of the neck above the clavicle.

Dr. Down brought forward this case as an example of a group of cases in which arrested development had been due (as he believed) to intoxication of one or both of the progenitors at the time of the procreative act. In each instance the "venous tumours" in the neck had been observed.

Two very remarkable cases of sporadic cretinism were described by Mr. Curling in a paper read before this Society

¹ 'Pathological Transactions,' *xx*, p. 419.

in the year 1850.¹ They are especially important, as being the only cases in which an opportunity has as yet been afforded of studying the anatomy of this morbid state.

Mr. Curling's first case was that of a child, *æt.* 10, a native of Lancashire, who was an inmate of the Idiot Asylum at Highgate, and was regarded by Dr. Little as a cretin. She measured 2 feet 6 inches in height. Her expression was idiotic; the mouth large, and the tongue thick and protuberant. She could not talk, and could only manage to walk from chair to chair with assistance. At the outer sides of the neck, external to the sterno-cleido-mastoid muscles, were two doughy inelastic swellings; similar swellings were also observed in front of the axillæ. She died of erysipelas, and Mr. Curling found that the peculiar swellings were composed simply of fat, which dipped down behind the clavicles and filled the axillæ. The fat was not encapsulated. There was not the slightest trace of a thyroid body.

Mr. Curling's second case was that of an infant, *æt.* 6 months, which was sent to him for examination on account of the existence of similar tumours. The infant had a marked idiotic expression; the tongue was large and protruding from the mouth. The child died, and the swellings were found to consist of superficial collections of fat tissue, without any investing envelope. No trace of the thyroid gland could be discovered.

The reports of these seven cases appear to show that the subjects of them presented a remarkable uniformity, both in their physical configuration and (in general) in their mental condition. The characteristic features of the disease may be summed up as follows:—

I. The body is stunted, the height scarcely exceeding four, three, or even two feet, in different cases. The head is round; the face is broad; the eyes are widely separated by the flat root of the nose; the *alæ nasi* are thick; the nostrils are

¹ "Two Cases of Absence of the Thyroid Body, and symmetrical swellings of fat tissue at the sides of the neck, connected with defective cerebral development." '*Med.-Chir. Trans.*,' xxxiii, p. 308.

rounded ; the mouth is very large and generally widely open ; the lips are thick ; the hands and feet, as well as the fingers and toes, are short and broad.

II. When "sporadic cretinism" is congenital it is also attended with deficiency in the mental powers, varying in degree, but of a character very like that which belongs to the "endemic" form of the disease. The child is free from the mischievous tendencies displayed by so many idiots. It is good humoured, but torpid, often sitting for a long time quiet in one place. Sometimes it can walk only with the assistance of a chair. It is not rarely deaf and dumb.

III. Sporadic cretinism, instead of being associated (like endemic cretinism) with goitre, appears to be attended with a wasting or absence of the thyroid body. The discovery of this fact by Mr. Curling has already been mentioned, and I am able to confirm it to this extent, that I can feel no trace of the thyroid in the neck of any of the four patients whom I have had an opportunity of examining.

On the other hand, sporadic cretinism seems to be invariably accompanied by the presence of symmetrical fatty tumours, one of which lies beneath the skin of the neck on each side, just external to the sterno-mastoid muscle.

IV. Sporadic cretinism is not necessarily congenital. It may arise as late as the eighth year in a subject previously healthy and well developed.

V. It is not related either to rickets or scrofula. It is not inherited syphilis.

VI. Not only is this form of cretinism sporadic, but it does not arise by the intensification of a morbid influence, of which earlier manifestations can be traced in the parents of those affected by it. It springs up, generally without apparent cause, in the offspring of a healthy father and mother.

VII. It has been supposed in certain cases to have resulted from one or both of the parents having been intoxicated at the time of procreation. But it does not seem that this explanation holds good for all cases, even for all those which are congenital. Nor does it appear that it can be attributed

to the employment of instruments in the delivery of the mother, a view which was at one time urged in reference to the endemic form of the disease.

The subject of sporadic cretinism appears hitherto to have attracted very little attention. I am not aware that anything has been written concerning it, with the exception of the papers which have already been quoted. In Virchow's great work on tumours I have failed to find any reference to it, either in the chapter on goitre (in which "endemic cretinism" is discussed at some length) or in that on fatty tumours.

It is, therefore, especially incumbent on me to state that, in the course of his clinical teaching at Guy's Hospital, Dr. Gull some years ago made me acquainted with many of the principal features exhibited by these cases. So far as I remember, the characters on which he laid most stress were the broad face, the flat nose and thick lips, the broad hands and feet, and the mild, tranquil disposition, so different from the mischievous tendencies of the idiots with whom these children are so generally associated. I do not think that Dr. Gull's attention had at that time been drawn to the presence of the peculiar tumours above the clavicles. He called the disease *cretinism*.

In the majority of cases *sporadic* cretinism, like *endemic* cretinism, is congenital. But Case 2 appears, beyond doubt, to be an example of the development of the same physical state as late as the eighth year in a child previously healthy. I believe that no instance of a similar kind has hitherto been recorded. It will be observed that in this case the peculiar physical configuration was alone manifested, or, at any rate, that any change in the mental powers was doubtful. It may, therefore, be interesting to speculate as to what characters would be present, should the disease (if that be possible) arise still later in the course of adult life. The peculiarities in the form of the cranial and facial bones, and in the bony framework generally, would then probably be absent, the development of the skeleton being unalterable when once completed. And I think we must conclude that

the most marked features in such a case would be a coarseness and thickness of the soft parts of the face (especially the lips), and perhaps of the subcutaneous tissues of the hands and feet, besides the presence of the supra-clavicular fatty tumours, and possibly a wasting of the thyroid body, if that should prove to be a constant character of the disease. I have heard that symmetrical fatty growths are not very uncommonly developed in adults in the supraclavicular regions, but I am not aware that their presence has hitherto been observed to be associated with an impairment of the general health.

The fact that in Case 2 the cretinous conformation of body began to manifest itself only when infancy had been passed is of interest from another point of view. It affords a broad ground of distinction between sporadic and endemic cretinism. For, so far as I can ascertain, such an occurrence has never been observed in those countries where cretinism is endemic. It is true that various opinions have been expressed as to whether it can be determined at the time of birth, or even within the first two years, that a child will become a cretin. But with advancing development the cretinous configuration appears always to manifest itself. In the Report of the Sardinian Commission¹ it is stated that "according to information received from medical men practising in infected districts and according to all those who have written on this degeneration, there is no example in which, after the seventh year, a healthy child has become a cretin." And the Commission further quote with approval the statement of Maffei (who practised for a long time where cretinism was endemic, and who, therefore, had good opportunities of observing), "that the period within which cretinism may commence is limited by the fourth year of life."

It must, indeed, be mentioned that Rösch² has recorded two cases in which the disease is said to have begun

¹ 'Rapport de la Commission créée par S. M. le Roi de Sardaigne pour étudier le Crétinisme,' Turin, 1848, p. 11.

² 'Untersuchungen über den Kretinismus in Württemberg,' Erlangen, 1844, pp. 179, 183.

respectively at five years of age and between seventeen and eighteen years ; but this writer avowedly includes under the name of cretinism a variety of forms of mental disturbance, occurring in subjects of widely different habits of body. Indeed, he expressly asserts that all idiots are cretins. The first of the cases above referred to was one of ordinary dementia, starting from convulsions, as is so often the case during childhood. Living where goitre was endemic, the patient had goitre ; but there is no reason to suppose that this was more than a coincidence. The other case seems simply to have been one of inherited insanity.

Should further researches show that an atrophy of the thyroid body is a constant feature in sporadic cretinism, it may be interesting to speculate whether this can possibly be the cause of the other changes which make up that morbid state. Such appears to have been the conclusion to which Mr. Curling inclined when he published his observations on the subject. And this view acquires great interest from the fact of the association of endemic cretinism with the opposite condition of goitre.

The discrepancy is, indeed, so striking that I have sought for an hypothesis by which (as I think) it may be explained.

In the first place it must be borne in mind that the relation between goitre and endemic cretinism is by no means a very simple one. Goitre prevails endemically in many parts of England where endemic cretinism is unknown. Goitre is the earlier effect of the endemic influence ; cretinism shows itself when the action of that influence is intensified by operating on more than one generation. From these facts it would be expected that the individuals most severely affected with cretinism would invariably have very large goitres ; but observation shows that the exact contrary is the case. In the worst cretins the thyroid body is often no larger than natural ; while persons with enormous tumours are frequently well developed, both physically and mentally, although they and their ancestors have long resided in the same neighbourhood, exposed to the morbid agency.

These considerations have led some observers to doubt

whether cretinism and goitre depend upon a common cause, and even to suppose that their association is a mere accident.

It appears to me, however, that the correct inference from the facts above stated is rather that a certain antagonism exists between goitre and cretinism. I have thought that when a large goitre exists, it may possibly have the power of protecting against the more severe effects of the endemic influence; and thus that cretinism is associated with an enormous bronchocele only when the exciting cause is present in a very intense degree.

It is well known that the most careful investigation has failed to show, either in the air, in the water, or in the soil of Alpine valleys where cretinism is endemic, the constant presence of any element, which is uniformly absent where the disease does not prevail. There is, therefore, nothing inconsistent with the facts in the supposition that the cause of cretinism may be much more widely diffused than the disease itself, although, doubtless, with an intensity varying in different localities. It is only needful that some counter-acting tendency should be discovered to account for the limitation of the disease.

It is at this point, as I think, that the occurrence of sporadic cretinism, in association with an absence of the thyroid body, may be brought to bear upon the theory of the subject. We have but to suppose that the healthy thyroid body is capable of exerting such a counteracting influence, and that in most parts of England the cause of cretinism acts only with a low degree of power; and we can then at once see why a form of cretinism should show itself when the thyroid body is atrophied.

I have already suggested that in those regions where cretinism prevails endemically, the bronchocele, which may be regarded as an hypertrophied thyroid body, exerts a similar action in protecting against the more powerful operation of the same cause; and this view appears to me to afford a satisfactory explanation of those relations between goitre and endemic cretinism which have hitherto appeared so difficult of comprehension.

DESCRIPTION OF PLATE II.

Cases of Sporadic Cretinism occurring in England.

FIG. 1. Case 1.—E. D—, idiot, with stunting of body and cretinous type of face. *Æt.* 8 years, 2 feet 7½ inches in height (see page 157).

FIG. 2.—Case 2.—Kate T—, stunting of body, with change of feature to a cretinous type, from attack of measles at 8 years of age. *Æt.* 16½ years, 4 feet 1 inch in height (see page 159).

FIG. 3. Case 3.—A. B—, idiot, with peculiar cretinous conformation. *Æt.* 20 years, 2 feet 4 inches in height (see page 162).

FIG. 4. Case 4.—C. D—, idiot, deaf and dumb, features cretinous. *Æt.* 12 years, 3 feet 10½ inches in height (see page 162).



Fig 1



Fig 2.



Fig 4



Fig 3.

A CLINICAL REPORT
ON
XANTHELASMA PALPEBRARUM,
AND ON
ITS SIGNIFICANCE AS A SYMPTOM.

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Received Feb. 11th.—Read March 14th, 1871.

[THE data upon which this paper is based consist of seven cases recorded by other observers and of nearly forty from my own notes. I have also availed myself in several instances of references to cases made by authors who have not recorded them in detail. All the cases which I have been able to collect are given in the appended tabular statements.]

The symptom which forms the subject of the following remarks has been long known to writers on skin diseases. It was, I believe, first definitely mentioned by M. Rayer, who spoke of the occurrence "on the eyelids and in their vicinity of little yellowish spots or patches very much like chamois-leather in colour, soft to the touch and slightly prominent, without heat or redness, and often very sym-

metrically disposed." M. Rayer, although he thus very concisely enumerated the local features of the disease in its more common form, gave to it no distinctive name; nor does he appear to have inquired as to the association with it of any constitutional phenomena. Dr. Addison subsequently recorded three cases and gave it the name of *Vitiligoidea plana*. Mr. Erasmus Wilson has more recently designated it as *Xanthelasma*, and as his name alludes merely to the most prominent feature of the disease, and involves no hypothesis as to its resemblance to "Vitiligo," I think it much the best. The form of the disease which is by far the most common is so constantly met with on only one part of the body that it will I think be convenient to refer to this fact in its name, and to speak of it (with Mr. Wilson) as *Xanthelasma palpebrarum*.

Dr. Addison was, I believe, the first to associate vitiligoidea with disease of the liver, an observation which has been confirmed respecting certain forms of vitiligoidea by several writers. I believe it is now generally acknowledged that when the vitiligoidea of Addison shows itself over the general surface of the body it is indicative of disease of the liver, that the patient will probably suffer from a peculiar form of jaundice, and that the disease will be attended with danger to life. Observers have, however, not paid much attention to the constitutional symptoms which attend the slighter and far more common forms of the disease in which it is limited to the eyelids. Dr. Addison recorded one case in which it was thus limited and two others in which it occurred on the eyelids and on other parts as well, and a few isolated cases by Mr. Wilson and others have since been published. Both Mr. Wilson and Professor Hebra have given good delineations of the disease. There can be little doubt that the disease is of the same character when it occurs on the eyelids only, and when it is met with on other parts of the surface and even in internal organs. The various adjectives "*plana*," "*tuberosa*," "*granulosa*," "*papulosa*," have been applied to varieties of a disease which is in all essential features the same, and their clinical applications are not a little difficult to assign correctly. Two at least of the cases pub-

lished by Dr. Addison in his first paper are not examples of true xanthelasma, and one of them probably belongs to a wholly different category, in which a very peculiar eruption occurs in connection with diabetes.

The chief object which I proposed to myself when, some years ago, I commenced to collect a series of cases of *Xanthelasma palpebrarum* was to ascertain whether its peculiar yellow patches could be considered symptomatic of any form of constitutional disease. The results of my inquiries are stated in the tables which accompany this paper. In order to avoid prolixity I will state my conclusions under the following heads :—

1st, in regard to the *Character of the Patches*, it is certain that they sometimes present remarkable deviations from the typical buff colour which has been so aptly compared to "chamois-leather." Repeatedly I have observed plugs of sebaceous matter projecting from the open orifices of follicles which were surrounded by yellow deposit. In some cases the follicular disease seems the chief part of the local malady, and when such is the case, the parts of the skin affected are the same, and the tendency to symmetry is as marked as in the more common forms. In a single instance¹ I found groups of serous cysts of considerable size arranged precisely as the patches of xanthelasma usually are, and in proof that this case really did belong to this category was the fact that a few small but perfectly characteristic yellow patches were interspersed amongst them. A portrait of this patient accompanies the paper, as also several others showing the sebaceous complications just alluded to. (See Plate III, figs. 1—3.) These cases seem to justify us in attaching great importance to the precise locality affected, as well as to the pathological conditions produced, and they suggest that it is very possible that the same constitutional cause may now and then find its expression in the production on these parts of conditions bearing little or no resemblance to the ordinary xanthelasma. Thus in one case, which however I have not ventured to count in the present series, an old man presented symmetrical patches of

¹ Case 11.

a curious form of acne which curved round the inner angles of his eyes, and did not occur on other parts of his face; it is very possible that these patches were as regards cause closely allied to xanthelasma.

2nd. *The parts affected.*—The disease invariably begins near to the inner canthus of the eye, and usually attacks both upper and lower lids, frequently curving round the canthus. When advanced its largest patches are almost always on the upper lid, and when it begins in a single patch that patch is usually seen on the upper lid. It is very common for it to begin in several places at the same time, and for the spots to coalesce into larger patches as it advances. I have not been able to find a single case in which it began near to the outer canthus, or in which it began on any other part of the face than the eyelids.

3rd. *Its symmetry.*—In advanced cases the disease is always symmetrical. Its symmetry is, however, often long delayed, and for several years it may happen that the patches are present only on one side. So far as my own observation goes, when one side only is affected it is almost invariably the *left*, and it curiously happens that the few cases on record by other observers, in which the side on which it begun is stated, all conform to this rule. The number of cases in which the disease was confined to the left side in my series was 10,¹ or rather less than one third of the whole. In several in which it was present on both sides it was more extensive on the left than on the right.² In only one,³ so far as my notes extend, was the reverse the case. In one case a patient who had had it on both sides alleged that it had begun on the right, but this statement rested only on her memory and may have been a mistake. It is difficult to avoid an impression that this remarkable fact must be dependent on something more than mere accident.

4th. *Age of the patient.*—The youngest patient in my

¹ Nos. 4, 5, 6, 15, 16, 17, 23, 25, 30, 36.

² Nos. 2, 9, 19, 22, 24, 29, 31, 32, 35.

³ No. 28.

series was 28 years of age when the disease commenced, the oldest 59 years, the average being 42 years.¹

If instead of the age at which the disease began we take that at which the patients first came under care, the two extremes will be 32 and 84, and the average of all the cases will be between 53 and 54 years.

5th. *Sex*.—Exactly one third of the whole number were males;² thus the disease would appear to be twice as frequent in the female sex.³

6th. *Evidence of constitutional disease*.—My chief inquiry was as to disease of the liver, and in connection with this my attention was early attracted to the circumstance that most of the patients had suffered in a very unusual degree from sick headaches. In fifteen⁴ cases there was the history of sick headaches of great severity; whilst in six others⁵ the same symptom had occurred, but with less violence. In several of the patients who had been liable to sick headaches other curious symptoms of functional derangement of the nervous system had shown themselves. One patient, a man (No. 31), had been liable to attacks of temporary blindness, from which he recovered usually within a few minutes. At length one of these left him permanently blind of one eye, without any ocular changes discoverable by the ophthalmoscope.⁶ His attacks of blindness had sometimes affected one eye, sometimes the other, and more rarely both at the same time. After the attack a violent sick headache always followed. In another case a woman (No. 11), who was the subject of the cystic variety of xanthelasma (see Plate III, fig. 1), had been liable to attacks

¹ The age at which the disease began is stated in only ten cases, and the above statements apply only to those cases.

² Twelve cases out of 36.

³ Mr. Wilson writes, "It is remarkable that the disorder is almost exclusively confined to women." Dr. Fagge states of a case under the care of Dr. Habershon, that he believed it to be the first instance of the disease together with jaundice occurring in a man. Dr. Murchison has, however, since recorded a fatal case in a man.

⁴ Nos. 5, 6, 11, 15, 18, 22, 24, 25, 26, 29, 30 33, 34, 35, 36.

⁵ Nos. 2, 4, 9, 17, 23, 31.

⁶ Recorded in detail in 'Ophthalmic Hospital Reports,' vol. vi, p. 275.

in which she lost the use of her hands; this loss of power was quite complete for a time, but did not last long; it was attended, also, with numbness. The numbness would usually not last more than about an hour, and was followed by a severe headache, which, after lasting for about half an hour, gave place to extreme hunger. A third patient, a woman, who had xanthelasma, and had suffered from jaundice, had been liable to numbness of the hands and feet on both sides, and had, at least on one occasion, become suddenly blind. Her attack of blindness, after lasting for an hour or two, passed completely away. In a fourth case a patient who had had great enlargement of the liver, with "black jaundice," had become insane during the illness. This gentleman's case is given in full in the Appendix.

It must be remarked that the disturbances in nerve function mentioned in these cases are such as occur now and then in association with sick headaches and other symptoms which are popularly supposed to be connected with the liver. "Swimming before the eyes" is a very common accompaniment of a sick headache, and it is now and then aggravated to a state of partial blindness, and occasional attacks of numbness in one or both of the hands is also sometimes mentioned in the same connexion.

The symptom of *jaundice* is noted as having been present in six cases¹ out of my series, and in all of these it had passed off at the time the patient came under my observation. None of the patients were severely ill when I saw them, though several gave the history of having formerly been so. In many of my cases I do not possess any positive note as to jaundice having never occurred, but, in spite of this omission, I feel confident that it had not been present, since, if it had been, it would certainly have been noted. Of the cases previously published by others, only seven in number (which I have tabulated in the appendix), jaundice is noted in all. Three of these seven presented the patches on other parts as well as the eyelids; whilst in four the disease was restricted

¹ Nos. 2, 5, 9, 13, 24, 26.

to the latter positions. In all the jaundice persisted at the time the patient came under observation, and we may, indeed, reasonably suppose that it was on account of it that the patient came under medical care. In almost all of these it is expressly noted that the liver was much enlarged. In one or two there is the record of attacks of temporary jaundice which had passed off before the occurrence of the one during which the patient came under observation. It seems clear that when the disease affects the general surface, the constitutional symptoms, and especially the hepatic disorder, are much aggravated. It is believed that at least three of the seven cases to which I have referred, as recorded by other observers, ended fatally. In none of my own cases were there any symptoms which in the least implied danger to life. The majority of them, indeed, came under my observation, as it were, accidentally, in connection with other and totally distinct maladies, or, in not a few cases, as the companions, of other patients. Dr. Hilton Fagge has mentioned, on the authority of Dr. Wilks, two cases of xanthelasma of the eyelids in which there were no hepatic symptoms, and Mr. Erasmus Wilson states that he has twice seen xanthelasma in *young* women in whom there was no symptom of torpid action of the liver; the most marked case, he says, occurred in a young woman who was "perfectly healthy in all her functions."

I am not aware that any writer has taken note of the symptom of sick headaches in reference to these cases, and it has probably been considered as too common and too trivial to be of much value; at any rate, it is not mentioned in any one of the seven cases to which I have referred. As the result of careful inquiry upon this point I cannot feel any doubt that the proportion of those in my series who had suffered severely from this symptom is in large excess of what happens in the population generally, whilst in most the headaches had been also of unusual severity. In about one third of my cases, however, they had not occurred in any remarkable degree, and I believe it may be said of nearly all these patients that they considered themselves in very good

health; many of them were already far advanced in life. Whilst, therefore, it is, I think, impossible to avoid the conclusion that xanthelasma of the eyelids does, in a majority of cases, indicate liability to disturbance in the function of the liver, we are bound to admit that in a not inconsiderable proportion this liability is quite compatible with long life and a fair average of health.

Speculations as to the cause of xanthelasma and its use as a symptom.—It is a fact not without its interest that in almost all the severe cases in which jaundice was associated with the xanthelasma, it had taken precedence of the latter as to date of occurrence. It is clear that the occurrence of xanthelasmic patches on the eyelids, unassociated with jaundice, whilst it may be interesting as enabling the observer to read his patient's history backwards, and especially to assert that sick headaches, &c., have, in all probability, preceded it, is of little or no importance for purposes of prognosis. It is well known that those liable to sick headaches during the early and middle periods of life often lose them as age advances; this fact is noted in not a few of my cases in which the xanthelasma appeared after the subsidence of the other symptoms of liver derangement. Xanthelasma would appear, therefore, to be a somewhat remote consequence rather than a coincident symptom. The absolute immunity of young persons also favours this view, and I have sometimes been tempted to suspect that xanthelasma of the eyelids stands in some relation to the temporary attacks of dusky pigmentation of those parts which is so well known to occur in connexion with temporary derangements, both of liver and uterus. A dark areola around the eyes is a very well-known symptom of the functional derangements referred to, and although its physical cause may probably be in part venous congestion, there can be no doubt that some pigimentary change also occurs. The parts most affected are those near to the inner angle of the eye, and these are precisely those in which xanthelasma usually makes its appearance. It is just possible that it is, after all, chiefly a senile

change in cell-structures which have been in former times very often the seat of temporary deviations from normal nutrition. We may note in this connection that many patients show, in addition to the xanthelasmic patches, a permanent condition of excessive pigmentation of the eyelids, and that a large majority are of a dark complexion. It is possible, further, that we have in this suggestion a clue to the explanation of the disproportionate frequency with which xanthelasma affects the female sex, and also to its occurrence in a certain number of cases without any evidence whatever of biliary derangement. In both sexes the generative organs are capable of disturbing, in a reflex manner, the general health, and of inducing symptoms at distant parts, such, for instance, as sick headaches or nervous headaches, and dark areolæ around the eyes. Although such symptoms may occur in either sex, they are, out of all proportion, more frequent, more severe, and more persistent in females. It may chance that it is precisely in the cases in which uterine disturbance has been at work that we get xanthelasma in females who have no derangement of the liver. We may note in reference to this point that in one of my cases the patient,¹ a woman, æt. 39, had ceased to menstruate at the age of 25, and that in one of the cases recorded by Dr. Addison menstruation had ceased at 35, and that the patient dated her illness from that time. It may even be suggested as possible that in some the physiological influence of pregnancy may have been the only one at work. Many women during pregnancy have pigment accumulations in the eyelids.

Whilst compiling this paper, and since the above remarks were written, a remarkable fact in confirmation of them has come to my knowledge. A medical friend who is the subject of xanthelasma, but who has never suffered from sick headaches or any marked symptoms of liver disturbance, tells me that whenever overfatigued or out of health, very conspicuous dark patches appear in his eyelids. To such an extent has this been the case that his friends always know when he is not feeling well.

¹ Case 11.

As regards the *precise nature of the yellow deposit*, I have at present no new histological facts to add; I take it, however, as quite certain that the changes are by no means so uniformly similar as has been supposed, and that the glandular structures of the skin are not unfrequently involved as well as the rete mucosum and corium. Possibly in some cases the changes occur only in sebaceous glands. In one case in which I cut out the patches, I found yellow deposits in isolated specks, just like those so constant in melanosis, in the cellular tissue under the skin.

Do xanthelasmic patches ever disappear? My belief is that they always either increase, or at least remain stationary. Although I have sometimes been told by patients that their patches were getting smaller, I have never obtained any proof which was convincing to my own mind.

On cases of great enlargement of the liver.—In conclusion, I wish to ask the attention of physicians to the interesting fact which has come prominently forward in connection with this inquiry, that there is a form of hepatic disorder in which the organ may increase immensely in size, in which jaundice may be present for a long time, and may even pass into the black variety, and yet the patient may recover. The two cases which chiefly justify this statement were under the care respectively of my friend Dr. Smith, of Cheltenham, and my colleague Dr. Andrew Clark. Each of these observers assured me that at one time his patient's liver was of enormous size, its enlargement easily visible, and "nearly filling the abdomen." In each long persistent jaundice occurred, and the patient's recovery was despaired of. In one case the patient became black. Yet in both instances the patient is at the present time in good health, the jaundice gone, the liver of its normal size, and nothing left but the patches on the eyelids. I am not aware that any cases quite parallel to these have been recorded. Several observers (Addison, Pavy, Fagge, Murchison) have recorded with much care the facts

as to disease of liver with xanthelasma, and have noticed moderate enlargement, but several of these cases ended fatally, and in none did the enlargement approach that just described.

Recapitulation.—Briefly, then, to *recapitulate* the principal conclusions to be deduced from my facts, we find—

1st. That xanthelasma never occurs in children, and is fairly common in the middle and senile periods of life.

2nd. That in a large majority of cases the patient is not seriously ill, nor in any danger of becoming so.

3rd. That in a small proportion of very severe cases, jaundice with great enlargement of the liver is met with.

4th. That when jaundice occurs it almost always precedes the xanthelasma.

5th. That the form of jaundice is peculiar, the skin being of an olive-brown or almost black tint, rather than yellow, and the colour remarkable for its long persistence.

6th. That the enlargement of the liver may be very great, and that it may subside and the patient regain good health.

7th. That in many cases in which there has been no jaundice there is yet the history of frequent and severe attacks of functional derangement of the liver.

8th. That xanthelasma occurs more frequently in females than in males, the proportion being two to one.

9th. That the xanthelasmic patches always occur on the eyelids first, and that in not more than about 7 per cent. do they ever extend to other parts.

10th. That the patches almost invariably occur first on the left side, and that they invariably¹ commence near to the inner canthus.

11th. That xanthelasmic patches on the eyelids are of little or no value for purposes of prognosis, being the evidence of past rather than of coming disturbances.

12th. That it is not improbable that they result from the

¹ In Case 31 the only patch on the *right* side was near the *outer* canthus the disease had, however, evidently begun on the left side where the patches were not confined to the outer canthus.

derangements in the nutrition of the skin of the eyelids which frequently occur in association with both hepatic and ovarian disturbances.

13th. That it is not improbable that patients who display xanthelasma unusually early in life, and who yet have no severe hepatic symptoms, are experiencing prematurely other forms of senile change.

14th. That any cause capable of producing dark areolæ round the eyes—pregnancy, liver derangement, ovarian disorder, or mere nervous fatigue—may predispose to xanthelasma.

15th. That the xanthelasmic patches may show themselves long after their predisposing cause has ceased to exist.

16th. That when the yellow patches are met with on other parts as well as the eyelids, they are almost always caused by liver disease.

17th. That the patches of true xanthelasma are always persistent, and usually tend slowly, but steadily, to increase.

18th. That if any eruption supposed to resemble xanthelasma should show a definite tendency to spontaneous subsidence, the correctness of the diagnosis ought to come under question.

19th. That the disease to which the term *vittiligoidea tuberosa* is chiefly applicable having been twice noticed in association with diabetes, and having in both instances come out suddenly, presented marked differences from ordinary xanthelasma, and also shown a tendency to cure, is in all probability a distinct malady.

The following cases appear to merit more detailed record than could be given them in the tabular form :

Xanthelasma palpebrarum. Severe hepatic dyspepsia. Repeated attacks of temporary blindness. Ultimately persistent blindness of one eye without ophthalmoscopic changes.

William Savage, æt. 45, of dark complexion. On the eyelids of the left eye are three patches, one at the outer canthus,

one above the inner canthus, and a third below that point. On the right lids there is a very small one at the outer canthus, corresponding exactly with that on the opposite side, but there are no representatives on this side of those on the upper and lower lids of the left side. The three patches on the left side are all of considerable size, a third of an inch long or more, and oval; that on the right side is a mere speck. They present the usual characters.

He states that he has suffered much from his liver and from indigestion. He has been very liable to sick headaches. Eight years ago he was under Dr. Gull's care for indigestion, and believes he was supposed to be threatened with consumption; he was so weak he could not work, and suffered much from pain in the head. He has long been accustomed to take medicine for his stomach. He takes aperient medicine to prevent sick headaches, but his bowels are not usually costive. His headaches are attended by giddiness. He has never had jaundice. He has had "rheumatic fever" three times.

He has for a long time been liable to attacks of temporary blindness, lasting only a minute or two, and usually followed by a sick headache. On a few occasions both eyes have failed in this way, but generally only one has been affected at the same time, and the right has suffered in this respect oftener than the left. His last attack occurred rather more than a fortnight ago, and it differed from all his previous attacks in ending with *permanent* blindness of one eye. While at work he found a cloud coming rapidly over the *right* eye, and in a minute or two he was quite blind in it and has remained so ever since. After the blindness came on he had as usual an attack of headache, which he spoke of as "great pressure on the head." His sick headaches have varied much in position at various times; sometimes the pain has been all over one side, while at others only a small patch has been affected.

On admission, April 19th, 1869, he is found to be quite blind in the *right* eye, while with the *left* he reads 1 J. easily ("Billiam"). Examination with the ophthalmoscope (made

on several occasions) discovered nothing abnormal. I lost sight of the man about three weeks after the attack described, and up to the date of his last visit no improvement had taken place.

Xanthelasma palpebrarum, with the history of a severe attack of black jaundice, and of several attacks of insanity. Violent sick headaches.

Mr. W—, an unmarried clergyman, æt. about 45, has very considerable patches of xanthelasma on his eyelids. The deposit is arranged quite symmetrically, and involves both upper and lower lids near to the inner canthus. It consists of small patches and groups of dots, which differ from the most common form only in being more raised and of a lighter tint of yellow, *i. e.*, not buff but a canary or lemon tint. Being much interested in the case I have succeeded in obtaining, partly from Mr. W. and partly from his medical attendant Dr. S., the following particulars as to his health. He suffered during the early part of his life from most violent sick headaches. Five years ago he became insane and was put under restraint. He himself always persisted in saying that it was nothing but a liver attack. He recovered perfectly after a time and returned to parochial duties. Another attack of the same kind, however, occurred, and he was again an inmate of an asylum. During his recovery from the second attack, and after the balance of his mind had been pretty well restored, he became very ill; he had an attack of jaundice, which Dr. S. told me surpassed in severity anything he had ever seen. The liver was now immensely enlarged, so much so that the prominence of the organ was easily visible. His complexion became after the jaundice so dark that he was sometimes taken for a mulatto; he himself told me that his colour was so dark that the street-boys used to remark, "There goes the black man." This all cleared off, and his complexion at present, excepting that it is swarthy, is not peculiar. At the time of the jaundice he had also a form of general dropsy, and partially lost the use of his lower extremities. It was expected that he would die.

*Xanthelasma palpebrarum, with symmetrical serous cysts.
History of transitory attacks of numbness and dimness of
sight. Severe sick headaches.*

Miss A—, æt. 46, florid and healthy looking, presents a very peculiar form of xanthelasma palpebrarum. On the upper and lower eyelids of each side near the inner canthus, and arranged in exact symmetry, are three serous cysts. One of these is just above the canthus, another a little below it, and a third on the lower lid near its middle. The epidermis over them is so thin that the transparent contents can be seen through it. There is not a trace of inflammation about them. Although symmetrical in position they are not exactly equal in size on the two sides. Above the middle one on each side is a small yellow patch of xanthelasma, and one or two other spots of the same may be found on careful search. I am precise in insisting upon this, because the yellow patches were too small to be made very apparent in the drawing. There cannot be the slightest doubt about these patches, and they are sufficient to prove the true relationships of the disease even if its curious position, symmetry, and history did not suffice to imply the same. The cysts have been present and gradually increasing for seven years, and have never caused the slightest pain.

Miss A—is of active habits, and has never suffered, so far as she knows, from liver disease. She ceased menstruation at the early age of twenty-five, and has never since had any menstrual discharge whatever. She has not been liable to any disturbance at her monthly periods, and the only symptoms which can be supposed to have had any connection with her ovaries or stomach are the following:—For many years past she has been liable to occasional attacks of numbness, during which her hands become useless because she cannot feel anything in them. After lasting about an hour this numbness passes off, and is followed by a short sick headache, not usually longer than half an hour, which is in its turn followed by abnormal hunger. She spoke very definitely about these numb attacks, and mentioned them very often.

During one such attack, which came on while she was out driving, her sight became dim, "a sort of half sight," and her "speech thick," so that it was with difficulty that she could speak to her companion; she managed, however, to continue driving the pony. This attack lasted half an hour, and was, as usual, followed by a bad headache. These seizures have not occurred regularly once a month, but only two or three times a year. They are always bad enough to require that she should lie down for a time. During the last twenty years the hair on the vertex of her head has been falling, and she is now quite bald in the middle region from forehead to occiput.

Xanthelasma palpebrarum. Amaurosis of right eye. Alopecia of scalp, trunk, and limbs. Commencing locomotor ataxy.

Joseph Pieri, æt. 57, an Irishman, who has lived for thirty-eight years in London. Married, and the father of fifteen children; had been a moderate drinker, and had never smoked; he was pale, but in good general health. He had not been liable to headaches, and had shown no symptoms of liver disease. He had known of the xanthelasma spots on his eyelids for only about six months.

On admission it was found that the inner extremity of the eyelid on each side, and the sides of the root of the nose, were dotted over with yellowish spots of various sizes, the largest the size of a split pea, the smallest only as large as a pin's head; all of them were elevated, and in the centre of nearly all was a black point, apparently the choked orifice of a sebaceous follicle. Some of the larger were yellow, flat, and level, without any orifices, and in every respect characteristic of xanthelasma. The majority of the spots were situated to the inner side of the eyelid, on the side of the nose; several, however, were on the eyelid itself. Those below the level of the canthus were very small. The disease was remarkably symmetrical, with a few slight variations.

He was quite blind. The *left* eye had been lost for many years; he appeared to have had a perforating ulcer of the

cornea, and had had iridectomy performed seven years before. The *right* eye had been blind for nine years; he had the faintest possible perception of light with this eye; the disc was atrophied, and the pupil small, motionless, and incapable of dilatation in the dark.

The hair of his scalp and eyebrows was almost entirely absent, only a few scattered white hairs remaining. He began to lose the hair of his scalp in patches sixteen years ago; it fell rapidly not only from the head but all over the body, and in six months he had lost almost all the hair on his body. He was not in the least ill while his hair was falling.

He stated that he did not know what a sick headache was, and had never had headaches of any kind. The only symptoms which seemed referable to the liver consisted of pain darting across the lower part of the chest; it was very frequent, but generally lasted only two or three minutes at a time. He stated that he had sometimes suffered from flatulence.

There were also present at the time of admission the following symptoms of locomotor ataxy. He complained of sharp shooting pains, "like lightning," in various parts of the limbs and trunk, but never in the head. He had been liable to them for about three years, and considered them "rheumatic." These pains were very severe indeed, but never lasted more than a few minutes; in walking he had often been obliged to stop for awhile on account of the sudden sharp pain in his limbs. There was no defect of sensation in his fingers, nor any weakness of his legs, but his gait was uncertain, and he stated that he would often fall if he were not very careful to catch hold of supports.

Table of Cases of *Xanthelasma Palpebrarum* (*Vitiligoidea*).

No.	Name, age, reference, date.	Age at which the disease began.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
1	Maria Jinks, 60, London Hospital, Sept., 1870	59	About 1 year	Small patches on the upper eyelids of both eyes, near the inner angles.	Had enjoyed good health, and had not suffered in any special degree from headaches, nor had any bilious symptoms	Her mother had died of "liver disease." She herself died under my care in the London Hospital of cancer of the vagina and bladder; her liver was not diseased.
2	A woman, 46, married	...	?	Elongated patches, with a few small round ones, on upper eyelids near inner canthus; none of them are distinctly glandular, but a few enlarged sebaceous glands were seen on the large patches; more abundant on left side than on right.	Sallow; black hair; liable for years to sick headaches and vomiting of bitter matter; head-ache frontal, and worse on right side; no constipation or indigestion; one attack of jaundice; often numbness of hands and feet on both sides; once loss of sight for an hour or two	<i>Vitiligoidea granulosa et plasa</i> . Note that the disease was more abundant on the left side.
3	A woman, 53, London Hospital, Dec. 16, 1867	...	...	Well-marked vitiligoidea of the eyelids.	...	There is no further note as to the vitiligoidea; she was admitted for a tumour of the femur, suspected to be a node.
4	Sophia Goring 55, 11, Glauco 82, Devon Lane, Bromley	...	Does not know	A single patch of the plane variety on the upper lid of the left eye, near inner canthus; none on right side.	Is subject to sick headaches and vomiting; these symptoms have been worse lately; for the last year or two has often had tingling and numbness in her hands and arms soon after she wakes in the morning	Note that the disease occurred only on the left side.

5	R. Arkell, 70, under Mr. Dixon's cure for cataracts	...	...	A single small round spot on left upper lid, yellow with a black speck in the middle.	Suffered from frequent severe headache from age of eighteen to about forty; headache frontal, and usually on right side; was an attack of painless glaucoma very nervous during this time; in his <i>left eye</i> . Note occurrence of xanthelasma on <i>left</i> side only.	Mr. Dixon extracted his cataracts; he had very good sight for a year; he then had an attack of painless glaucoma in his <i>left eye</i> . Note occur- rence of xanthelasma on <i>left</i> side only.
6	Mrs. Fenwick, 64, under treatment in Nov., 1860, for Meibomian tumours	...	...	A small patch of xanthelasma on upper lid of <i>left</i> eye only.	Florid and healthy; for many years has had very severe sick- headaches, with retching; no jaundice, but often under treat- ment for what she considers "liver attacks"	Note its occurrence on <i>left</i> side only.
7	Mrs. Q—, 59	58	1 year	Symmetrical patches near each inner canthus, chiefly on upper lids; those on <i>right</i> side came six months before those on <i>left</i> .	Fair complexion, florid, healthy looking; no sick headaches, but frequent indigestion and vomiting after eating indigestible things (<i>eg.</i> , raw fruit or fat); no con- stipation; no numbness	Disease began on <i>right</i> side.
8	Mr. —, 75, from Winchelsea	...	...	Symmetrical patches, the largest on the upper lids; they are partly in patches and partly in dots.	Will not admit any ailment, except a former attack of ague; had no family history of such patches; for many years has been a total abstainer	When the patches first form- ed he used to squeeze yellow matter from them.

No.	Name, age, reference, date.	Age at which the disease began.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
9	Thomas Higgins, 58, (Case xxxix of herpes frontalis)	...	...	Symmetrical patches of whitish-yellow at each inner canthus and group of yellowish spots on not of late; jaundice twenty each lower lid. More marked on years ago; had "ague and low fever" seven years ago.	Pale, good health; formerly very subject to sick headaches, side.	Note predominance on <i>left</i> side.
10	Joseph Pieri, 57, amaurosis of right eye, alopia, locomotor ataxy, (Case lvi, O. H. R.)	...	6 mos. about	Symmetrical groups of yellowish spots on side of nose and inner parts of eyelids; most chest; occasional flatulence; for spots had a black dot in the middle; some were, however, from atrophy of nerve, and in large, flat, yellow, and devoid of orifices.	No sick headaches; occasional darting pains at lower part of chest; occasional flatulence; for many years blind in <i>right</i> eye from atrophy of nerve, and in <i>left</i> from perforating ulcer; for sixteen years has been nearly bald all over; some symptoms of ataxy (shooting pains, uncertain gait)	—
11	Miss Ashpole, 46, Dr. Peacock's patient, by whom she was sent to me	39	7 years	Symmetrical, small spots of yellow, and several cysts in connection with the yellow spots. These cysts are much more easily seen than the yellow spots; there are three on each side; they are near the inner canthus; they are not quite equal on the two sides.	Florid, healthy-looking; head bald in middle line; dark hair; ceased menstruation at twenty-five years old; for many years numbness and headache, &c., during her occasional attacks of numbness, her hands are useless, her speech thick; after an hour this passes off, and is followed by sick headaches for a short time; these attacks do not occur oftener than three times a year	The cystic character of the disease in this case is very remarkable. The characteristic of the menstrual disturbance, are noteworthy.

13	Dr. —, 40	38	3 years	Patches of xanthelasma on the eyelids.	Dark complexion, sallow, stout; lived formerly in a hot climate; dyspeptic, but no other hepatic symptom	Under treatment for another skin disease.
13	Mrs. Goldmann, 49, London Hospital	47	2 years about	Numerous scattered patches in upper and lower lids; most of them near the inner canthus.	In fair health; skin rather yellow; says she has been jaundiced for two years, and was in the London Hospital for dropsy and diseased liver; she has piles, and has suffered much with them	The patches began to form during the jaundice.
14	A Jewess, 80, London Hospital, April, 1869, inguinal hernia	...	Several years	Symmetrical patches near each inner canthus.	Dark, sallow; had had good health; denied having had jaundice or hepatic symptoms	This patient was remarkable for her extreme emaciation, and yet she seemed in good health.
15	Mr. A—, 50, Dr. Stone's patient	...	...	A single patch, of moderate size, on the <i>left</i> lower eyelid, near inner canthus; none elsewhere.	Dark, sallow, stout; severe sick headaches formerly, less severe of late; very dyspeptic (could not eat beef); never jaundiced; "swimming before the eyes" during his indigestion	He attributed the relief from headaches to the formation of a large ulcer on his arm; he had taken much iodide of potassium for its cure. Note affection of <i>left</i> eyelid only.
16	Anne Wyatt, 74, London Hospital, July, 1869, cataracts	...	...	A single flattened papule, as large as a pea on left upper eyelid; a black point at centre.	Formerly suffered much from what was called "bilious colic;" she was a woman of dark complexion, and very sallow	It is noted that the patch was on the <i>left</i> side; it was excised, and a <i>small cyst found in its centre</i> .
17	Mrs. B—, 49, Selby, June, 1869	...	...	A single patch of rather large size on the upper lid near inner canthus on <i>left</i> side; none elsewhere.	Pale, of dark complexion; considered herself bilious, and occasionally suffered from sick headaches; never jaundiced	Note its occurrence on <i>left</i> side only.

No.	Name, age, reference, date.	Age at which the disease began.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
18	A man, 64, commercial traveller, Mr. Rose's patient.	...	...	Symmetrical xanthelasma on each upper lid near inner canthus	Had terrible sick headaches till he was twenty-five years old, since then they have diminished; has had rheumatism; has had eczema rubrum of one leg; bowels habitually constipated; florid, very stout, in good health; gray irides and dark hair	—
19	Mary Anne Coterill, 60, London Hospital, Sept. 13, 1869, fract. radius and ulna	...	...	Patches (three in number) on upper lid, near inner canthus of <i>left</i> eye; a <i>single</i> patch on corresponding part of <i>right</i> upper lid	Hair nearly white; is emaciated and rather sallow; has had good health, excepting habitual slight constipation when young; no hepatic symptoms	Note greater extent of disease on <i>left</i> side.
20	"An old lady"	...	...	Symmetrical groups of separate flat-topped papules, in both lids on both sides, near each inner canthus	Dark complexion; good health; liable to sickness from slight causes; dyspeptic; never jaundiced	...
21	Mrs. Self, 84, F. p. 70, Moorfields, no date	...	...	"Xanthelasma palpebrarum slight"	...	No other note as to xanthelasma; she was at Moorfields for cataracts.
22	Mrs. Orviss, 60, C. p. 276, Moorfields, Jan. 17, 1870	...	...	Patches (two in number) on the <i>left</i> side, one being on each lid; on the <i>right</i> side is only <i>one</i> sick headache and nausea; slight patch, less marked than those on left	Sallow; black hair; since girlhood has suffered from severe predominance on <i>left</i> side. Often becomes dim shortly before a headache comes on; cannot eat fat things; no numbness; headaches began before puberty, and have been less severe since catamenia ceased	Compare with No. 11. Note predominance on <i>left</i> side.

23	Harriet Jones, 36, C., p. 306, July, 1869	34 about	A single patch near inner canthus, on upper lid on <i>left</i> side; none elsewhere	Pale; brown hair, freckled; frequently has some headache; only dyspeptic; has often been told her liver was out of order; numbness of hands often when dyspeptic; has had several tumours (probably adenocoele) removed by Mr. Spencer Wells from both breasts; had abscesses in early life; married; no living children	Note occurrence on <i>left</i> side only.
24	Clara Hobbs, 33, S. H., Feb. 8, 1870	28 about	Two small patches on each upper lid; quite symmetrical in position; slightly larger on <i>left</i> eyelid	Dark, sallow skin; very dark hair, and dark eyelids; liable to severe sick headaches and retch-patches appeared soon after a long confinement, and about the same time as her headaches began. No numbness or dimness of sight; no constipation or indigestion; jaundice many years ago; has piles	Note slight predominance on <i>left</i> side; she believes the patches appeared soon after a long confinement, and about the same time as her headaches began.
25	Wm. Rollinson, 45, London Hos- pital, O. P., un- der care of Mr. Adams, Nov. 28, 1870	...	A single patch as large as half a threepenny piece on upper lid of <i>left</i> eye; none elsewhere; it is well marked	Considers himself bilious; formerly suffered severely from headache (frontal); but it has been less severe of late; dyspeptic; soon vomits if he eats too much	Note occurrence only on <i>left</i> side.
26	The Rev. Mr. W—, 45	...	Symmetrical patches on upper and lower lids of both eyes; small patches and groups of dots, somewhat more raised than usual, and of a brighter yellow	An unmarried man, with dark, "swarthy" complexion; suffered from most violent sick head-aches in early life; has had two attacks of insanity within the last five years; after second attack he suffered from very severe jaundice ("black jaundice") and was very ill; during the illness he had a very large liver, some general droopy, and partially lost the use of his legs; he has recovered perfectly.	He always asserted that his insanity was only due to a "liver attack."

No.	Name, age, reference, date.	Age at which the disease began.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
27	Mrs. Allen, 50	...	...	Symmetrical patches at inner canthi, on upper lids	Stout, florid, dark hair, good health; no history of sick headaches or other hepatic symptoms	...
28	Mrs. Kirby, 32, Ophthalmic Hospital, Nov., 1868	28	4 years	Small symmetrical spots near the inner canthi on lower lids; that on the <i>right</i> side is the larger	Brown complexion, rather sal- low, rather stout; not liable to the sick headaches; digestion con- sidered good	Her paternal grandmother. now aged 80, is said to hav- the same extensively.
29	A woman, about 40, Hosp. Skin Diseases, Jan. 13, 1871	...	Several months	Symmetrical small patches on the upper eyelids, just above the inner canthi; that on the <i>left</i> side came first, and consisted of a group of five or six sebaceous glands distended with sebum, around the orifices of which yellow deposit; this patch had been present a few months	This patient had suffered in a most remarkable degree from frequent and more severe dur- ing the last year; her mother and her daughter had suffered in a similar way; her mother was believed not to have any yellow patches on her skin.	Her headaches had been more frequent and more severe dur- ing the last year; her mother and her daughter had suffered in a similar way; her mother was believed not to have any yellow patches on her skin.
80	Anne Gardner, 57, London Hos- pital, Jan. 14, 1871	...	...	A number of flat-topped, en- larged sebaceous glands, with yellowish contents and black points in their centres, and pro- bably some deposit in the sur- rounding skin, but not enough to unite them into a single patch; on the <i>left</i> lids, near inner canthus; on the <i>right</i> side there were three or four slightly en- larged	Salow, dark hair, becoming grey; liable to bad sick head- aches for many years, they began several years before marriage, and have been less severe of late; the pain is frontal, and usually on the right side; has suffered much from dyspepsia, and especially clusively on the left side, and in the usual position for xan- thelasma, together with their	In this case enlargement of sebaceous glands, a sort of flat-topped acne, was the most marked, but there was also slight deposit in the skin at the bases of the papules; the occur- rence of the spots almost ex- clusively on the left side, and in the usual position for xan- thelasma, together with their

31	Wm. Savage, 45, 'Ophthalmic Hosp. Reports,' vol. vi, p. 275	...	...	glands, with black points, but without any considerable amount of secretion, and without any yellow colour	For long has been very subject to sick headaches and indiges- tion of <i>left</i> eyelids, also that the headaches have often the attacks of dimness were preceded by temporary, but generally in the <i>right</i> eye; it complete, blindness of one eye, generally the right; in the last attack the right eye was affected, and has remained permanently blind; the headaches have gene- rally been unsymmetrical	Note almost exclusive affec- tion of <i>left</i> eyelids, also that the attacks of dimness were generally in the <i>right</i> eye; it is not stated on which side the headache occurred.	colour, and the symptoms de- scribed by the patient, clearly point to a close relationship between this case and the typical instances of the disease
32	Dr. L. J—, 42, 1871	40	2 years	A well-marked patch in left upper lid, and a very small one in right	Never had sick-headaches; is very active and abstemious; di- gestion excellent; has a very dark areola round his eyes, which has often been noticed to be darker when he is tired, anxious, &c.; complexion dark	Inherits a tendency to gout, and his brother also has xan- thelasma; no members of the family except these two have dark complexions; is liable to attacks of numbness in the hand if he drinks only a few glasses of wine.	
33	J—, 62.	...	...	Large patches of xanthelasma in both upper eyelids	Has suffered from sick-head- aches severely; complexion very dark	Brother of the above.	
34	Lady —, 60. Patient of Dr. L. J.	...	...	Patches of xanthelasma over each eye	For many years liable to terrible headaches—"paralysing" head- aches; two years ago had epi- lepsy, and latterly has had attacks of abstraction, during which she forgets what is going on, and what she has been saying	...	

No.	Name, age, reference, date.	Age at which disease began.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
35	Mrs. —, 50, 1871	49	1 year	A number of flat-topped whitish yellow spots around each inner canthus; much more marked on left side	Had bad sick-headaches in early life, but now only occasional; good health; has had ten children	Her daughter, æt. 18, suffers severely from headaches, and gets very dark around her eyelids.
36	Mrs. R—, 65, Feb. 14, 1871	...	...	Patch of light yellow xanthelasma in left upper lid near inner canthus	Liable in early life to very severe nervous headaches; never specially bilious; has borne children; is in fair health; florid complexion and blue eyes	...

Tabular Statement of Seven Cases of Xanthelasma, collected from the published Reports of other observers.

1	Mrs. B—, 42, Dr. Addison (Addison's works, N. S. S. Edition, p. 159)	41	1 year	The eyelids, upper and lower, and around inner canthus; the palms of the hands and fingers; in the latter part opaque yellowish discoloration only	The patient died after jaundice of four years' duration; examination; the jaundice began before the xanthelasma; she had had the patient was of fair complexion in the right hypochondrium	No record of post-mortem
2	Eliza Partridge, 33, ibid., p. 161	...	...	It began in the hands, spreading across flexures of the joints and the palms; soon afterwards patches appeared near the inner canthus of each eye; afterwards the backs of both elbows were affected, and then the ears and fronts of knees	A sudden attack of jaundice is the earliest symptom mentioned; there were pains in the hypochondria, and the liver was enlarged and tender; the jaundice was subsequently liable to exacerbations; the skin remained permanently of a dull lemon-tint	This case began in 1848; the patient's death has not been recorded; the jaundice began fourteen months before the xanthelasma.

3	Mrs. J—, 43, <i>ibid.</i> , p. 162	5 years	It began on the <i>left</i> upper eyelid, near inner canthus, and subsequently became symmetrical	The catamenia ceased at the age of thirty-five, and she never well afterwards; had pains in the right side, and through the shoulders; she became jaundiced, and the skin assumed permanently a "deep olive-brown" colour	In this case it would appear that the jaundice came on after the xanthelasma.
4	R. C—, a woman, 45, under care of Dr. Barlow in Guy's Hospital in 1864. 'Path. Soc. Tr.', vol. xix, p. 441, recorded by Dr. Hilton Fagge	10 months	Symmetrical patches on the upper and lower eyelids, near the inner canthus; much <i>larger</i> on the <i>left</i> than on the right side; on the left side there was a patch near the outer canthus, which had no corresponding one on the right side	Eight or nine years ago she had an attack of jaundice, from which she recovered; it returned believed that the patches on the <i>left</i> side had developed suddenly; they had been present only a few months; note greater abundance on <i>left</i> side.	No record of post-mortem examination; the patient believed that the patches on the <i>left</i> side had developed suddenly; they had been present only a few months; note greater abundance on <i>left</i> side.
5	J. B—, a man, 38, under care of Dr. Habershon in Guy's Hospital in 1868, <i>ibid.</i> , vol. xix, p. 434, recorded by Dr. Hilton Fagge	1 year	Symmetrical patches on upper and lower lids near inner canthus, those round the <i>left eye</i> most marked	Jaundice appeared one year before the xanthelasma. Skin is described as of a "warm yellow" colour, not at all greenish. The liver was considerably enlarged, and somewhat tender; the urine contained bile; his motions were of proper colour.	The jaundice preceded the xanthelasma; Dr. Fagge says that "it looked more like that of a man who had been in a tropical climate than that of a patient with organic hepatic disease;" the man had had syphilis eleven years ago; note greater abundance on <i>left</i> side.
6	Louisa L—, under Dr. Pavy's care in Guy's	2 years	Soon after the second attack of jaundice small lumps began to appear on the backs of her fingers,	Jaundice occurred three years before the xanthelasma, and disappeared after ten months, but returned after at the tubercles, which showed	Dr. Pavy obtained a microscopic examination of one of the tubercles, which showed

No.	Name, age, reference, date.	Age at which the disease began.	Duration of disease.	Character and position of patches.	Previous health.	Remarks.
	Hospital in 1866 (Guy's Hospital Report, 1866, p. 277)			and subsequently cream-coloured patches on the hands and around the eyes; the patches were scattered here and there over the body generally; the patches on the eyelids entirely surrounded the eyes	three months' interval, and became permanent; she had much stinging and itching in the skin, and it became in all parts tender to the touch; her skin became a greenish-yellow colour; the urine contained bile; the liver was greatly enlarged.	exceedingly dense fibrous tissue with interspersed fat-granules. Dr. Hilton Fagge has recorded the subsequent progress of this patient: eighteen months later her skin disease had increased, and her liver had also become much more enlarged, it now occupied the greater part of the abdomen; she had been frequently laid up from weakness and pain in the abdomen.
7	Angelo S—, 41, under Dr. Minchinison, 1868 (Path. Soc. Trans., xi, p. 189)	41	6 mon.	On both eyelids of both eyes there were the usual patches; no patches elsewhere	He had been intemperate, had lost appetite, become weak, and suffered from morning vomiting; for eighteen months he had had jaundice; for twelve months pain in the region of the liver; and thickened; the spleen was greatly enlarged; a microscopic examination of the xanthelasma patches was made, and everywhere deeply jaundiced, a tint amounting almost to bronzing.	This patient died, after delirium with diarrhoea and exhaustion; the liver weighed eighty-four ounces; it was smooth, and its capsule was thickened; the spleen was greatly enlarged; a microscopic examination of the xanthelasma patches was made, and consisted in the deposit of a large quantity of oily granules.

DESCRIPTION OF PLATE III.

FIG. 1.—*Xanthelasma palpebrarum*, with symmetrical serous cysts. (See Case 11 in Table, p. 190.)

FIG. 2.—Single patch of *xanthelasma*, with sebaceous plug. Case of Mrs. W— under care for cataract at the London Hospital. (See Case 16 in Table, p. 191.)

FIG. 3.—Symmetrical *xanthelasma palpebrarum*. Case of an elderly woman under care in the London Hospital for fracture of the leg.

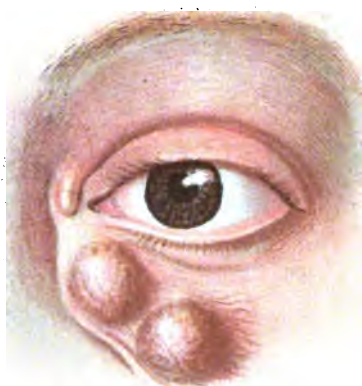


Fig 1.



Fig 2.

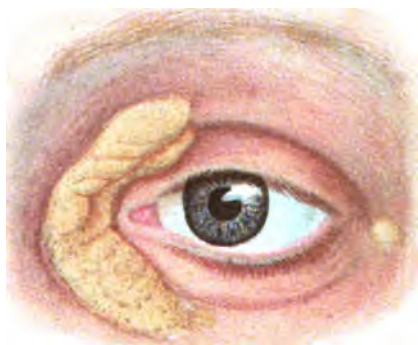
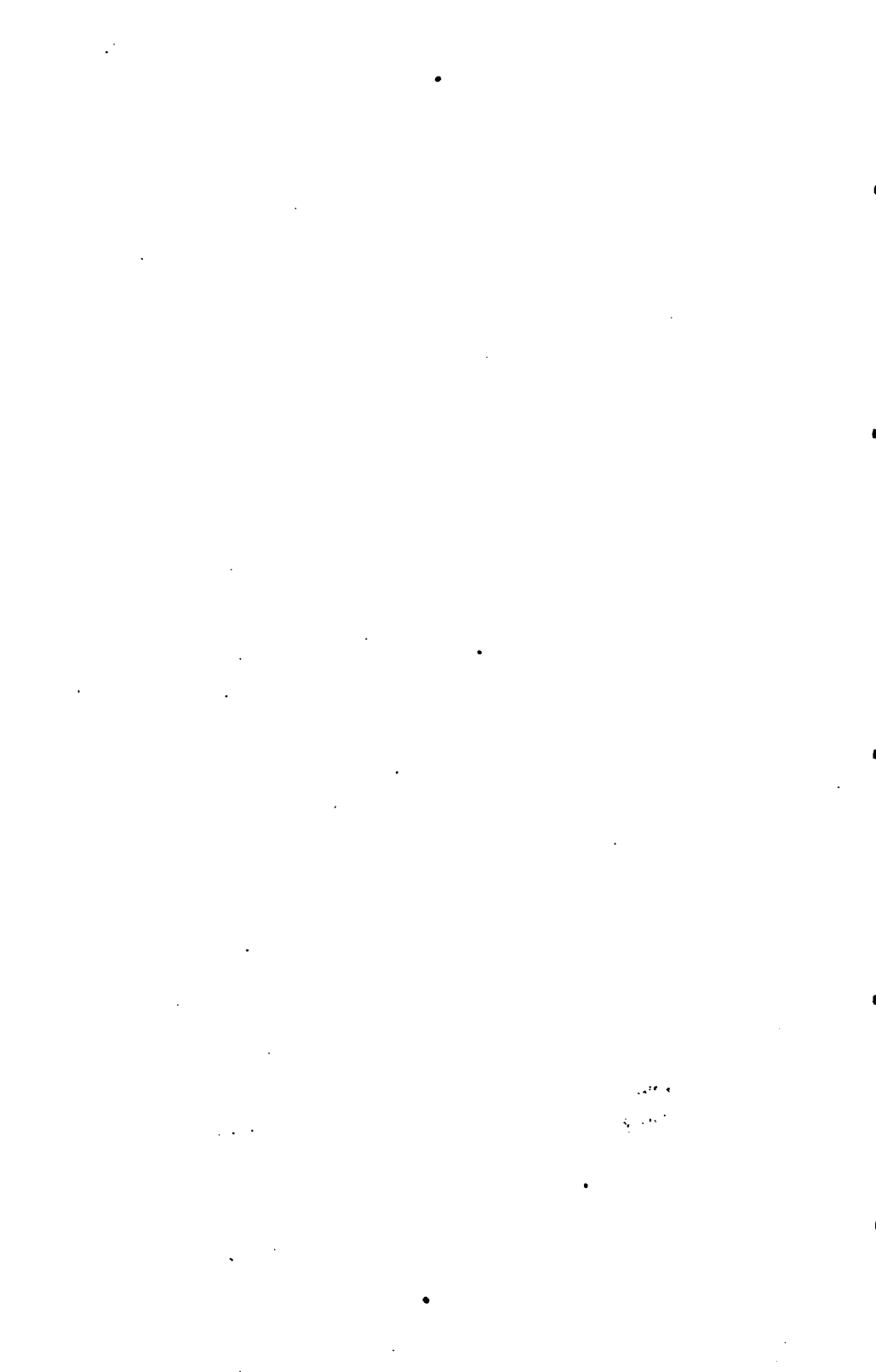


Fig 3



ON THE
CLASSIFICATION AND TABULATION
OF
INJURIES AND SURGICAL OPERATIONS
IN TIME OF WAR.

BY
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It is well known to those who have studied the subject of the specialities of military surgical practice that some of the best established rules of field surgery, especially as regards gunshot injuries, have been arrived at by estimating the results, statistically collected, following different methods of treatment, as well expectant as operative. It is generally believed, moreover, that many other questions of practice, equally important for field surgeons, which are still wavering under the influence of conflicting opinions, are only awaiting the collection of sufficiently comprehensive and reliable statistics to be placed on a similarly settled basis. And now that armies are brought together on a more vast scale than ever owing to the increased means of transport and locomotion, while the numbers of wounded are counted by thousands instead of the hundreds of former years, there is, unhappily, no want of materials for forming such statistics; the best method of

of treatment. If wounds of different characters and of different degrees of gravity, wounds complicated with serious lesions of neighbouring organs, and others simple and uncomplicated, are mixed together under one heading, deductions drawn from the tabular returns in which they are included must contain so many sources of error as to be rendered unreliable and valueless for any scientific purpose whatever. Yet, almost self-evident as this statement appears to be, it was not until the year 1855, nor until ten months after the battle of the Alma, that there was any authorised classification of gunshot wounds in the army medical regulations of the British service. At the date mentioned, July, 1855, a systematic classification which had been formed by Inspector-General Taylor, C.B., was regularly introduced into the army returns, and it is still the form under which all returns of wounds occurring in the field are ordered to be tabulated. As this was a very important innovation, as not even an approach to scientific accuracy in returns of injuries received in battle can be said to have existed until its introduction, and as the same classification is not followed in other countries, while all concur in the need of some system as little open to objections as possible, it will be useful to explain to some extent the nature of Mr. Taylor's classification, and to indicate its practical value. These will be best understood by taking a brief glance at the ill results of the previous absence of an authorised system, and of the faulty plans of arrangement which were occasionally employed by surgeons of their own accord.

Previously to the period of the Crimean War the general medical regulations of the army only required the *numbers* of the gunshot wounds occurring in particular battles and campaigns to be stated. No distinction was required in any of the numerical returns to be made between the *nature* of one wound and that of another. It was, however, expected that in the professional reports furnished at stated periods by medical officers, the histories of any cases of particular interest should be mentioned at full length. It was left to the discretion of the surgeons to select the cases to be thus reported upon. In the year 1813 special instruc-

tions were issued for the guidance of surgeons serving with the armies in the Peninsula, and in these the situations of wounds were ordered to be noted in the returns of sick and wounded.¹ This referred simply to regional situation. Sometimes it has happened that surgeons of hospitals have classified of their own accord the cases which fell under their care, or have selected certain groups of cases for more detailed tabulation. The nature of such tables will obviously vary with the professional attainments and abilities of the surgeons who compile them. Under the most favorable circumstances in these respects, however, in consequence of different plans adopted for framing the tables, and owing to the different professional views held by different surgeons, and in some instances the tendency to put prominently forward specially successful results, or features having particular attractions for the several reporters, the tabular returns from these various sources can very rarely be employed with advantage for purposes of comparison one with another.

Such returns, too, are often found to be so imperfect in themselves as not only to be useless for purposes of comparison, but even for conveying reliable information on many of the very points for which they have been specially prepared. The last year in which any considerable number of soldiers were invalided home to England on account of wounds received in action prior to the time of the Crimean War was the year 1848. The wounded men referred to were sent from India, New Zealand, and the Cape of Good Hope; and the cases of all those who were admitted into the General Invaliding Hospital, then at Fort Pitt, were exhibited together in a special return, the first column of which was intended to show the particular regions of the body wounded, and the

¹ It would seem strange at the present day for an order to be issued to medical officers to make a distinction between *wounds* and *ulcers*; yet such an order was considered necessary in the year 1813. In the printed orders for the regulation of the military hospitals with the Marquis of Wellington's army in the Peninsula, Article 43 enjoins:—"In all returns wounds are always to be distinguished from ulcers, and the site of the wound or ulcer is to be always noted." No form for classifying or tabulating the wounds was included in the regulations.

remaining columns the results of the wounds and the various ways in which the patients were finally disposed of. On examining the column showing the situations of the wounds, the first line is found to show all the wounds of the head and face classed together, and I need hardly mention what different considerations are involved in wounds of these two regions. Then follow wounds of the thorax; thirdly, wounds of the abdomen; and, fourthly, wounds of the back; without any subdivisions to show whether parietes only, or the cavities connected with them, or visceral or other complications, were involved in the injuries. Five headings then followed for the upper extremity, viz., wounds of the shoulder, arm, elbow, forearm, and hand; and five for the lower extremity, viz., wounds of the hip, thigh, knee, leg, and foot; without any indications to point to injuries of bones, nerves, arteries, &c., with which some of them were certainly complicated. To what real practical advantage could such information be converted? The returns of a corresponding kind which have been handed down to us from the Peninsula campaigns are for the most part equally unsatisfactory in the same respects. Inspector-General Taylor made the following remarks in reference to this fact when proposing his own scheme of classification:—"The necessity for some such classification as that now proposed is obvious from referring to the returns furnished during the Peninsular War. These will be found nearly uninteresting and uninformative in consequence of the want of distinction amongst wounds of wholly different nature and quality. In wounds of the head, chest, and abdomen, no distinction is made between simple flesh wounds of these regions and injuries to the more important viscera. The returns do not even distinguish between incised and gunshot wounds, which are of such totally different value even in the same parts. All kinds of wounds seem brought together simply as 'surgical cases;' and in some of the returns of capital operations it is not clear whether fingers and toes have, or have not, been included under the terms 'upper' and 'lower' extremities." Investigation fully confirms these statements of Mr. Taylor. It is important to be

aware of the fact that these uncertainties and serious imperfections do exist in the comparatively recent professional returns referred to, for in almost all systematic works of surgery they are used as standards of comparison for a variety of objects ; to exhibit the results of amputations in different regions, for example.

Inspector-General Taylor's classification was formed with the design of removing the objectionable confusion, and supplying the deficiencies, which I have described as existing in these older returns. Mr. Taylor began his classification in India, at the time of the Sutlej campaign, but completed it in its present authorised shape in the Crimea, when in medical charge of the 3rd division of the army. Early in 1855 an order was issued for Mr. Taylor's form of descriptive return to be used in all army professional documents, both by the surgeons actually in the field, and by those on duty in the general hospitals in rear.¹

It may be safely asserted that this was the first time that a general classification of gunshot wounds at all approaching to precision—one, too, combining comprehensiveness with accuracy of detail and all requisite elements of practical utility—had been employed in the army returns of any country. When the present revised code of regulations for the medical department of the British army was framed in accordance with the recommendations of the Royal Commissioners in the year 1858, the classification was embodied in them with some slight modifications, and it still remains the form according to which gunshot and other wounds received in action are required to be enumerated and described by the surgeons under whose care they come for observation and treatment. The separate returns from corps and detachments of troops are combined in one general descriptive return,

¹ In the year 1856 Mr. Taylor published his classification, together with some explanatory observations, in the form of a small pamphlet. See 'A Classification of Wounds and Injuries received in action, proposed for use in military hospitals, submitted to the Director General of the Army and Ordnance Medical Department, and to the Principal Medical Officer with the army in the Crimea.' By J. R. Taylor, C.B., Deputy Inspector-General, Camp near Sebastopol, January 26th, 1856.

having the same form of classification, by the chief medical officer of the army.

All the wounds and injuries among the non-commissioned officers and men received during the Crimean War and treated in the field and general hospitals from the 1st of April, 1855, to the end of the war, 7161 in number, have been defined, and the results of their treatment shown, by returns tabulated in accordance with Taylor's classification, in the Government report on the medical history of the war. The wounds of the commissioned officers have been similarly classified for the whole period of the war. The system of classification had not been introduced into India at the time of the Sepoy mutiny, so that we have no medical and surgical history of that war as we have of the Crimean War; but the wounds of all the men of the British forces which led to the subjects of them being invalided home to England,¹ have been recorded with precision according to the authorised classification; and, equally so, all the wounds and injuries which were received during the last war in New Zealand. No returns or records exist by which the vast numbers of wounds received in the wars in which this country was engaged prior to the Crimean campaign—in the Peninsula, in Belgium, in India, and elsewhere—can be defined; scarcely anything more than their mere numbers, and these very imperfect, were ever recorded. This neglect is not likely to happen again in any future war in which this country may be engaged.

The form of Inspector-General Taylor's 'Descriptive Numerical Return of Wounds,' the history of which I have described in the foregoing remarks, comprehends fifteen classes. The first twelve of these contain the classification of gunshot injuries; the remaining three classes include incised, stabbing, and miscellaneous wounds and injuries. When employed in the Crimea printed copies of this classification were issued in forms convenient for the insertion of the necessary numbers, numerical returns; and others so arranged as to afford room for detailed remarks on particular cases of wounds.

¹ See 'Army Medical Reports,' vol. iv, pp. 463—471. London, 1864.

Descriptive Numerical Return of Wounds and Injuries received in Action, admitted into the Hospital of the _____, between the _____ of _____, and _____ of _____ 18—.

_____, the _____ of _____, 18—

CLASSIFICATION AND SPECIFICATION OF WOUNDS AND INJURIES.		Remained on the _____ 18—	Since admitted.	Died.	Discharged to duty.	Transferred			
						To other hospitals or stations.	Readmitted for other diseases.	Readmitted for capital operation.	Remained on the _____ 18—
1. GUNSHOT WOUNDS OF THE HEAD.	1. Contusions and simple flesh wounds of scalp { Slight Severe								
	2. With contusion or fraction of the cranium, without depression								
	3. Ditto, with depression.....								
	4. Penetrating the cranium.....								
	5. Perforating ditto								
2. GUNSHOT WOUNDS OF THE FACE.	1. Simple flesh contusions and wounds... { Slight Severe								
	2. Penetrating, perforating, or lacerating the bony structures, without lesion of important organs								
	3. Ditto, with lesion of the								
	4. With fracture of the lower jaw								
3. GUNSHOT WOUNDS OF THE NECK.	1. Simple flesh contusions and wounds... { Slight Severe								
	2. With injury of the {								
4. GUNSHOT WOUNDS OF THE CHEST.	1. Simple flesh contusions and wounds... { Slight Severe								
	2. With injury of bony or cartilaginous parietes, without lesion of contents								
	3. With lesion of contents by contusion, or with non-penetrating wound.....								
	4. Penetrating, and ball lodged, or apparently lodged								
	5. Perforating contents { Superficially Deeply								

DESCRIPTIVE NUMERICAL RETURN OF WOUNDS—*Continued.*

CLASSIFICATION AND SPECIFICATION OF WOUNDS AND INJURIES.		Remained on the _____, 18__	Since admitted.	Died.	Discharged to duty.	Transferred			
						To other hospitals or stations.	Readmitted for other diseases.	Readmitted for capital operation.	Remained on the _____, 18__
5. GUNSHOT WOUNDS OF THE ABDOMEN.	1. Simple flesh contusions and wounds...	{ Slight Severe							
	2. Contusions or non-penetrating wound with lesion of	{ _____ _____ _____							
	3. Penetrating or perforating, with lesion of	{ _____ _____ _____							
6. GUNSHOT WOUNDS OF BACK AND SPINE.	1. Simple flesh contusions and wounds...	{ Slight Severe							
	2. With fracture of vertebra, without lesion of spinal cord	{ _____ _____ _____							
	3. With lesion of spinal cord ...	{ _____ _____ _____							
7. GUNSHOT CONTUSIONS AND WOUNDS OF THE PERINEUM AND GENITAL AND URINARY ORGANS, NOT BEING AT THE SAME TIME WOUNDS OF THE PERITONEUM.....		{ _____ _____ _____ _____ _____							
8. GUNSHOT WOUNDS OF THE UPPER EXTREMITIES.	1. Simple flesh contusions and wounds...	{ Slight Severe							
	2. With contusion and partial fracture of long bones, including fracture of the clavicle and scapula	{ _____ _____ _____							
	3. Simple fracture of long bones by contusion from round shot	{ _____ _____ _____							
	4. With compound fracture of	{ Humerus Radius Ulna Ulna & Radius All three bones							
	5. Penetrating, perforating, or lacerating the several structures of the carpus and metacarpus	{ _____ _____ _____							
	6. Dividing or lacerating the structures of the fingers or thumbs	{ _____ _____ _____							

I have mentioned that some modifications of Inspector-General Taylor's classification were made when the revised medical regulations for the army medical service were issued in 1858. Mr. Taylor's "descriptive numerical return" was specially prepared for use as a hospital return, that is, for use after the patients had been admitted into a hospital and placed under regular hospital treatment. But it was thought necessary by those who framed the revised regulations that besides this a return of all the injuries received in each action should be obtained as soon after the action as possible by the principal medical officer, so that a trustworthy report of all the casualties resulting from the engagement might be furnished to the commanding officer of the forces without delay.¹ While keeping the same classified arrangement, it was necessary for this purpose to alter the headings of the separate columns. Instead of indicating changes taking place under hospital treatment, the columns were used for indicating the nature of the missiles or weapons by which the several regional and special injuries had been inflicted. This reduced the number of classes from 15 to 12; the injuries of classes 13, 14, and 15, "Sword," "Bayonet," and "Miscellaneous" wounds, being tabulated in three separate *columns* of the return. The whole return was framed to include the deaths directly consequent on the injuries inflicted in the action—all distributed regionally and according to their causes just the same as the injuries of those who survived to come under surgical treatment. I suppose this was something intended to be aimed at, rather than expected to be carried into execution. It is no small matter, even with a thorough systematic

¹ *Medical Statistics of an Army in the Field:*

1. When an army is in the field a daily medical return of diseases is to be made up by the regimental surgeon or medical officer in charge on Form M, and transmitted to the principal medical officer, to be used for his report to the commanding officer of the forces.

2. *A classified return of wounds and injuries received in each action is to be sent on Form N as soon as possible by the surgeon or medical officer in charge to the principal medical officer.*

3. A classified return of wounds and injuries of every kind received in action and admitted into hospital is to be made up in Form O, and transmitted by the regimental surgeon or medical officer in charge to the principal medical officer at the conclusion of each week. (Extract from 'Army Medical Regulations,' London, 1859, pp. 94, 95.)

arrangement, and with a well-organized and disciplined division of labour, to obtain a fair approach towards accuracy in enumerating the number of the wounded and the nature of their injuries after battles; to ascertain and define the injuries of the killed on fields of battle, under ordinary circumstances, is impracticable. The comparatively few medical officers present on such occasions have not time enough to attend properly to the wants of the living wounded, much less time to spare for determining the particular injuries of the dead, who often lie very widely scattered over the ground. Unfortunately the return has been so framed that unless this information is given, the document, purporting as it does to include the "total wounds and injuries" inflicted in a given action must always be an incomplete and, so far, an erroneous one. This might be avoided by having a separate return for the injuries of those dying on the field of action before receiving surgical aid; it being enjoined for it to be filled up when circumstances might admit of the required information being obtained, which could only happen on occasions of comparatively slight engagements with limited numbers of casualties. The return just described, and designated Form N, is shown on the following page.

The classified return of injuries adopted in the military regulations for indicating the *admissions into hospital and their results* is not altered in any material respect from the original return elaborated by Inspector-General Taylor; the classification is limited to twelve classes in the same way as the previous *return of casualties in action*; the incised, stabbing, and miscellaneous injuries being shown under the same form, but in a separate return from those caused by gunshot, instead of being tabulated in one and the same return under additional classes. This return, designated Form O, follows on page 215.

Inspector-General Taylor appended to his classification of injuries a form of return for showing in a systematic and concise manner the capital operations performed in consequence of them, and their results. With a trifling addition this also was adopted in the Revised Army Medical Regulations. (For the Form (P) of this return see p. 216.

[Form N.]

CLASSIFIED RETURN OF WOUNDS AND INJURIES RECEIVED IN ACTION ON THE

N.B.—Separate Forms should be used for (1) Officers and for (2) Non-commissioned Officers and Men.

[This Form may be used for various purposes where Returns of Wounds and Injuries are to be made, the headings being altered according to circumstances.]

Regions of the body wounded or injured.	ADMISSIONS.						DEATHS									
	WITH WOUNDS OR INJURIES.						CONSEQUENT ON THE FOREGOING WOUNDS AND INJURIES.									
	Projectile or weapon by which the wounds or injuries were inflicted.						Projectile or weapon by which the wounds or injuries were inflicted.									
Total wounded or injured.	Cannon ball.	Shell.	Grapeshot.	Rifle, musket, pistol ball.	Sword lance.	Bayonet.	Other or undetermined means.	Among total wounded.	Cannon ball.	Shell.	Grapeshot.	Rifle, musket, pistol ball.	Sword lance.	Bayonet.	Other or undetermined means.	
ALL WOUNDS AND INJURIES.																
1. WOUNDS of the HEAD																
2. WOUNDS of the FACE																
3. WOUNDS of the NECK																
4. WOUNDS of the CHEST																
5. WOUNDS of the ABDOMEN																
6. WOUNDS of the BACK and SPINE																
7. WOUNDS of the PERINEUM and GENITAL and URINARY ORGANS, not being Wounds of the Peritoneum																
8. WOUNDS of the UPPER EXTREMITIES																
9. WOUNDS of the LOWER EXTREMITIES																
10. WOUNDS with direct injury of the LARGE ARTERIES, not being cases of compound fracture																
11. WOUNDS with direct penetration or perforation of the LARGE JOINTS																
12. WOUNDS with direct injury of the LARGE NERVES, not being at the same time cases of compound fracture																

N.B.—The Classification will be continued by the expansion of each of these 12 heads, so as to show the precise character of the Wounds and Injuries.

[Form O.]

CLASSIFIED RETURN OF WOUNDS AND INJURIES OF EVERY KIND RECEIVED IN ACTION ABROAD.
Admitted into the Hospital of ——— between the ——— of ——— and ——— of ———, 18

N.B.—Separate Forms should be used for (1) Officers and for (2) Non-commissioned Officers and Men.

[A separate Form may be used for Gunshot Wounds as distinguished from other Wounds.]

Region of the body wounded or injured.	Since admitted. _____, 18	Amputations.			Died.	Discharged to duty.	Transferred.		Remaining on the _____, 18
		Primary.	Secondary.	Excision.			To other hospitals.	To England.	
ALL WOUNDS AND INJURIES. 1. WOUNDS of the HEAD 2. WOUNDS of the FACE 3. WOUNDS of the NECK 4. WOUNDS of the CHEST 5. WOUNDS of the ABDOMEN 6. WOUNDS of the BACK and SPINE 7. WOUNDS of the PERINEUM and GENITAL and URINARY ORGANS, not being Wounds of the Peritoneum 8. WOUNDS of the UPPER EXTREMITIES 9. WOUNDS of the LOWER EXTREMITIES 10. WOUNDS with direct injury of the LARGE ARTERIES, not being cases of compound fracture 11. WOUNDS with direct penetration or perforation of the LARGE JOINTS 12. WOUNDS with direct injury of the LARGE NERVES, not being at the same time cases of compound fracture									

N.B.—The Classification will be continued by the expansion of each of these 12 heads, so as to show the precise character of the Wounds and Injuries.

[Form P.]

Classified Return of Operations performed and of Deaths following them between the — day of — and the — day of —, 18—, in the — Hospital.

Nature of operations.	Operations performed.		Deaths following the foregoing operations.	
	Primary.	Secondary.	Primary.	Secondary.
AMPUTATIONS.				
TOTAL				
UPPER EXTREMITIES.				
Shoulder-joint				
Arm				
Fore-arm				
Thumbs				
Fingers				
LOWER EXTREMITIES.				
Hip-joint				
Thigh { At upp. third				
At mid. third				
At low. third				
Leg				
Ankle-joint				
Medio-tarsus				
Tarsometatarsus				
Toes				
EXCISIONS.				
UPPER EX-TERMITIES.				
.....				
.....				
.....				
LOWER EX-TERMITIES.				
.....				
.....				
.....				
.....				
.....				
EXTRACTION OF BALLS AND OTHER FOREIGN BODIES.....				
TREPHINING				
LIGATURES OF {				
ARTERIES ... {				
OTHER OPERATIONS.....				

Those who care to study and compare the classification I have thus described with other systems will, I believe, find it to be the best essentially as well as the best fitted for use in the field. I would only suggest one alteration in the general outline of the classification, and this chiefly in order to obtain more complete uniformity. This suggested alteration is the abstraction of class ten, "wounds of large arteries," and of class twelve, "wounds of large nerves," and their transference to the list of subdivisions in classes eight and nine, wounds of the upper and lower extremities, in the manner set forth below.¹ The tabulation of wounds of important arteries and nerves of other regions, as of the face, neck, &c., is already provided for in the subdivisions of the classes comprehending the regions in which the injuries may have happened to have occurred. By this means the classes will be reduced from twelve to ten. All the classes will then be regional: and all the orders, or subdivisions, structural.

A few alterations, or rather additions, also appear to me to be necessary for the subdivisions,² but it would travel away from my purpose to discuss them here. One special advantage of the classification is that any such addition which may be decided to be necessary, whether for general purposes or to meet a particular occasion, can be readily made without in any way disturbing the main plan or framework.

So much for what has been done in this country towards collecting scientific professional statistics of the injuries from war by regularly classified numerical returns, as well as for establishing a definite system on which the surgical results of

8. GUNSHOT INJURIES OF THE UPPER EXTREMI- TIES.	¹ <div> <div>1. Simple Flesh } Slight, contusions } Severe and wounds }</div> <div>2. With injury of large blood-vessels.....</div> <div>3. With injury of large nerves</div> <div>4. With contusion and partial fracture of long bones, &c.</div> <div>(The remainder as in Taylor's classification.)</div> </div>	9. GUNSHOT INJURIES OF THE LOWER EXTREMI- TIES.	¹ <div> <div>1. Single flesh } Slight contusions } Severe and wounds }</div> <div>2. With injury of large blood-vessels.....</div> <div>3. With injury of large nerves</div> <div>4. With contusion and partial fracture of long bones, &c.</div> <div>(The remainder as in Taylor's classification.)</div> </div>

² Such as I have indicated with regard to "Injuries of the Head" on p. 30.

future wars in which this country may happen to be engaged, can be compared with the results in those which have been previously recorded. There are other official documents by which these professional statistics may be checked: monthly, quarterly, and annual professional returns and reports from medical officers; nominal returns of killed and wounded furnished by corps to the Adjutant-General's department, and nominal returns of those who die in hospital to the medical department; documents connected with the invaliding of the disabled soldiers, and with the pensions awarded to officers and men for disabilities, in which more or less of professional information bearing on the nature of the cases is included. But in discussing the subject of the classification of injuries received on fields of action as I have done, I have kept in view the machinery devised for furnishing the records of the nature and results not of particular groups of cases, but of all the injuries and operations resulting from battles; for, as will appear hereafter, it will entirely depend on the quality and suitableness of this machinery whether the information afforded through its means is of any real value to those who find occasion for studying works which purport to contain complete and true professional histories of campaigns.

Classifications employed in the armies of other countries.

The only other countries besides England which have published official surgical and statistical histories of the wars in which they have been engaged are the United States and France. They have been published since the date of the Crimean war. I propose now to glance at the systems adopted in these two countries in collecting the facts on which the statistics of these histories have been formed, and to describe briefly the forms of classification of injuries employed in them. And first as regards the plan adopted by the United States.

Collection and classification of the surgical statistics of war injuries in the United States.

During the year 1861, in which the great war of the rebellion commenced, and during the first eight months of the year 1862, like ourselves at starting in the Crimean war, the United States' surgeons were only required to furnish monthly and quarterly reports of sick and wounded, with one general heading for gunshot injuries.¹

In an official circular emanating from the surgeon-general's office, Washington, dated July the 1st, 1863, it is stated:—"Previous to that month (September, 1862) the surgical statistics of the war are absolutely worthless. The only information procurable is such as can be derived from an examination of a mass of reports, all of which present merely certain figures under the vague and unsatisfactory heading *Vulnus sclopeticum*."² It has been since mentioned that "a careful re-examination of these records prove that they contain a large amount of material that is far from valueless;"³ but, seeing that it is also stated in the same document that, during the period above referred to, "the returns from about one half of the regiments in the field gave an aggregate of over thirty thousand cases of gunshot injury," how different from "far from valueless" would have been the expression applied to them had they all been scientifically classified

¹ At the time mentioned "Wounds" were recorded in the American hospital returns under four headings:—*Vulnus incisum*; *V. contusum vel laceratum*; *V. punctum*; and *V. sclopeticum*. No further specification of them was required; but, as in the British regulations, there was an injunction in the 'Report of Sick and Wounded' that "cases of unusual interest will be reported in detail."

All the forms of hospital returns in use in the United States' army medical service up to September, 1862, may be seen in the 'Handbook for the Military Surgeon,' by C. S. Tripler, M.D., Surgeon United States Army, and G. C. Blackman M.D., Professor of Surgery in the Med. Coll. of Ohio, 3rd edit., Cincinnati, 1862.

² Consolidated Statement of Gunshot Wounds. Circular No. 9. Surgeon-General's office, July 1, 1863, p. 2.

³ Circular No. 6. Surgeon-general's office, November 1, 1865, p. 3.

and recorded as under other conditions they might have been!

In the year 1862 a special form was adopted by the United States' Army Medical Department for tabulating the gunshot injuries resulting from the war. The classification of the so-called "Tabular Statement," the form of which is shown on the next page differed materially from that of the classification adopted in the British service. Instead of the principal classes being *Regional*, as in the British tables, they were made *Structural* in the American. The injuries were distributed under four great classes—wounds of flesh, wounds of cavities, wounds of bones, and wounds of joints. These four structural classes were subdivided by regions. The flesh wounds were subdivided into wounds of the head, neck, trunk, external genitals, upper and lower extremities; and, in like manner, the wounds of bones and joints into those of particular bones and joints. The wounds of cavities were strangely subdivided into the seven following orders:—1, wounds of brain; 2, lungs; 3, other wounds of thoracic cavity; 4, stomach; 5, intestines; 6, bladder; and 7, other wounds of abdominal cavity.

No provision was made for tabulating wounds of large arteries, nerves, organs of special sense, and other important structures of the body. Another most important defect was that no provision existed in the "tabular statement" for indicating special differences in the nature of the wounds inflicted. All were numerically mixed together, the most trifling with the most grave, the most simple with the most complicated. So far as the figures of such a tabular statement, taken by themselves, are concerned, I believe them to be almost practically worthless. The following is the form of the tabular statement just mentioned.

In addition to the figures in the tabular statement the United States' regulations provided, like our own, for brief reports on particular cases of wounds in the periodical hospital returns of sick. A further amount of information would be procurable from the case-books in which the cases treated in hospital are required to be recorded at greater or less length. All, however, who are familiar with such records know how very little information of real and reliable value is ordinarily to be found in them. A certain proportion of such books will contain records in which the nature and progress of cases, and all important points of professional interest, are faithfully and accurately described, so that there is no difficulty on subsequent examination in distributing the cases under their proper categories, and using them for other scientific purposes; but, on the other hand, a large proportion—from inadvertence, want of time, indolence, or the absence of the requisite knowledge to enable the case-takers to appreciate properly the points of real value—will simply be filled with routine entries, neither capable of supplying the materials for building up statistical information of any worth, nor of being turned to account in any way for the improvement of future practice.

Moreover, with dependence on such an arrangement for the supply of information, it necessarily follows that a vast amount of labour and time must be expended at some central office in perusing and sifting the whole of these documents; and, if it be thought worth the pains, in carrying on correspondence having for its object to make up deficiencies, to get explanations of doubtful expressions, to reconcile contradictory statements, and this, too, long after the occurrences referred to have passed by.

These difficulties were experienced at the Surgeon-General's office in Washington. In January, 1864, new registers for cases of wounds and operations were introduced for use in the field and in the general hospitals, on forms recommended by a committee of medical officers. The registers for the general hospitals contained minute directions for entering cases under appropriate headings. Each page of the register

was divided into a series of blank columns, and each column was required to have written in it certain information indicated at the head of the column. A special form of bed-head card was adopted to assist in the compilation of these registers.

When these new arrangements for tabulating and recording the experience gained by the medical officers in the field and general hospitals had been put in force, as the documents successively arrived at the Surgeon-General's office in Washington, a large number of medical officers and clerks were occupied in classifying and transcribing their contents. The injuries by gunshot appear to have been at first classified, and entered in corresponding volumes, under nine headings, viz. —1, wounds of the head and face; 2, of the neck and chest; 3, of the abdomen, back, and spine; 4, of the perinæum and genito-urinary organs; 5, fractures of the upper extremities; 6, fractures of the lower extremities; 7, flesh wounds of the upper extremities; 8, flesh wounds of the lower extremities; 9, wounds of arteries, veins and nerves; a tenth volume being devoted to sword, bayonet, and miscellaneous injuries. The cases of operation were recorded under five headings, viz. :—1, amputations in continuity; 2, amputations in contiguity; 3, excisions; 4, ligations; and 5, miscellaneous operations. The labour involved in this proceeding may be estimated from the fact stated in page 5 of Circular No. 6, 1865, that "on September the 1st, 1864, there had been transcribed upon these registers the histories of 30,435 wounds, and of 1172 operations."

But, vast as the labour employed was, this mode of classification did not prove sufficiently satisfactory, and in October, 1864, the task was undertaken of revising the surgical records in the Surgeon-General's office anew. In order to group together only similar orders of injuries, it was determined to classify them under a larger series of sub-divisions. The collection of cases included under the first heading, "Gunshot Wounds of the Head and Face," were separated into six distinct classes, and so on with the others. Eventually a classification of the wounds and injuries was adopted

which, so far as gunshot injuries are concerned, divides them under twenty-eight headings, three others being devoted to certain accidents resulting from them, viz., tetanus, secondary hæmorrhage, and pyæmia. Surgical operations were also classified under twenty-eight headings.

The classification thus adopted is stated, in a report by Surgeon Otis,¹ to be "less elaborate than that employed in the British statistics of the surgery in the Crimea, and more detailed than that followed by Dr. Chenu in the French Surgical Report of the Crimean war." I will presently attempt to compare its advantages with those of the classification adapted in the British service, the latter of which, I am of opinion, far preponderate.

The classification finally adopted in the United States, is shown in the following tables, which exhibit the number of cases of each class that had been registered in the Surgeon-General's office at Washington on September 30th, 1865.

¹ Circular No. 6. Ante cit., p. 6.

Gunshot fractures and injuries of the cranium	1108
Gunshot fractures of the bones of the face	1579
Gunshot fractures of the spine, not involving the chest or abdomen	187
Gunshot fractures of the ribs, without injury of the thoracic or abdominal viscera	180
Gunshot fractures of the pelvis, not involving the peri- toneal cavity	387
Gunshot wounds of the scapula and clavicle, not impli- cating the thoracic cavity	389
Gunshot fractures of the humerus	2408
Gunshot fractures of the radius and ulna	785
Gunshot fractures of the carpus and metacarpus	790
Gunshot fractures of the femur	1957
Gunshot fractures of the patella and knee-joint	1220
Gunshot fractures of the tibia and fibula	1056
Gunshot fractures of the tarsus and metatarsus	629
Gunshot penetrating wounds of the chest, and injuries implicating the thoracic viscera	2308
Gunshot penetrating wounds of the abdomen, and in- juries involving the abdominal viscera	565
Gunshot scalp wounds	3942
Gunshot flesh wounds of the face	2588
Gunshot wounds of the neck	1329
Gunshot wounds of the thoracic parietes	4759
Gunshot wounds of the back	5195
Gunshot wounds of the abdominal parietes	2181
Gunshot wounds of the genito-urinary organs	468
Gunshot wounds of the upper extremities	21,248
Gunshot wounds of the lower extremities	25,152
Gunshot wounds of arteries	44
Gunshot wounds of veins	3
Gunshot wounds of nerves	76
Sabre wounds	106
Bayonet wounds	143
Simple fractures and miscellaneous wounds and injuries	2833
Cases of tetanus	863
Cases of secondary hæmorrhage	1035
Cases of pyæmia	754
Total	87,822

Amputations of the fingers	1849
Amputations of the wrist-joint	46
Amputations of the fore-arm	992
Amputations at the elbow-joint	19
Amputations of the arm	2706
Amputations at the shoulder-joint	437
Amputations of the toes	802
Amputations of the foot (partial)	160
Amputations of the ankle-joint	73
Amputations of the leg	8014
Amputations at the knee-joint	132
Amputations of the thigh	2984
Amputations at the hip-joint	21
Excisions of the head of the humerus	575
Excisions of the elbow	315
Excisions of the wrist	34
Excisions of the ankle	22
Excisions in the continuity of the upper extremities { Shaft of humerus Radius Ulna Radius and ulna	695
Excisions of the shafts of the tibia and fibula { Tibia Fibula Tibia and fibula	220
Excisions of the knee	11
Excisions of the shaft of the femur	68
Excisions of the head of the femur	32
Excisions of bones of the face or trunk	101
Trephining	221
Ligations of arteries	404
Extractions of foreign bodies	726
Operations for surgical diseases	443
Operations not included in other categories	23
Total	17,125

An examination of this classification shows that, though extended, the principles of the arrangement originally adopted in the "Tabular Statement" before described, are in a great measure adhered to. The first thirteen classes are all fractures or *Injuries of Bones*; the fourteenth and fifteenth are *Wounds of Cavities*; the following nine classes are *Flesh* wounds; the three following, *Wounds of Blood-vessels and Nerves*. The remaining classes consist of injuries from other causes than gunshot, or include certain consequences of wounds. The "Flesh Wounds," "Wounds of Cavities," and "Gunshot Fractures," constituting the three chief sections of the "Tabular Statement" classification, are retained; wounds of blood-vessels and nerves are added; the fourth and remaining section of the tabular statement, "Wounds of Joints," cease to be specified, with the exception of "Fractures of the Patella and Knee-joint." The wounds of joints must, therefore, be included in the classes of fractures of bones of the extremities and flesh wounds of the extremities, according as the joint wounds have happened to occur with, or without, fracture of bone. To which class a joint wound involving two or more of the bones forming the articulation, all three bones of the elbow, for example, would be referred, is not apparent. Considering the very peculiar qualities of wounds of joints, the special questions which concern the treatment of wounds of joints generally in the field as well as of particular joints, it is surely an arrangement open to many objections to mix them up indiscriminately in a numerical table with wounds of bones in which joints are not implicated.

*Collection of Surgical Statistics in time of war, and their
classification in France.*

The classification of injuries published in the grand works of Dr. Chenu on the Crimean and Italian wars—the most extensive, the most complete, and, at the same time, the most faithful medico-chirurgical histories that have ever been published of French military campaigns—may be accepted

as the classification authorised by the medical department of the French army, these works having been published under the official auspices of the Conseil de Santé, and I take it as the standard of comparison with the classifications employed in the British and United States' medico-military services.

The professional documents by which information is afforded on the nature and results of the injuries of soldiers received into field and other hospitals in the French army are very simple. They consist of schedules termed "*Cahiers de visite*," and they answer at one and at the same time the purposes of the diet tables, case-books, and other hospital returns used in the British service. Each patient entering a French ambulance or hospital is required to have his name, grade, regiment, and date of entrance placed in specified columns on two of these *Cahiers de visite*, one for the even and one for the uneven days of the month. The date of the receipt of the wound, its nature, and its result, whether leading to return to duty, discharge to other hospital, or death, are also noted on this document. Each schedule contains divisions for the daily prescriptions of diets, extras, remedies, and observations on changes in the patient's condition. After the completion of these schedules, they are transmitted to the Intendance Department, where they serve for the verification and liquidation of accounts.

As Dr. Chenu has observed, "if these schedules were always kept as the regulations require, they would convey information the most certain and most valuable for the medico-chirurgical statistics of a campaign; but it is not often possible to get a scrupulously careful regard paid to them in the field. Imperious necessities of the moment, the too frequent overcrowding of patients, excessive number of entries on the same day, sudden evacuations of hospitals, deficiency in the number of surgeons and hospital attendants, and the inevitable disorder and errors which are the consequence of these things, sufficiently explain the omissions so much to be regretted from every point of view" (*Campagne d'Orient*, p. 6). Dr. Chenu states that the field hospitals of the French army in the

Crimea furnished comparatively few regular "cahiers de visite," and that even those of the hospitals on the Bosphorus were not complete. A number of them were burned when one of the hospitals at Constantinople was destroyed by fire.

There were, however, some other means available to Dr. Chenu for partly supplying these deficiencies. The most reliable were the documents furnished to the Ministry of War, viz. (1.) those relating to officers and soldiers to whom pensions were accorded for injuries. These documents, being vouchers for outlay of public money, had been made with scrupulous exactness, verified in repeated ways, bore in every instance a strict account of the origin and nature of the injury or surgical operation for which the pension was given, and were carefully preserved for future reference. (2.) The nominal returns of deaths and missing. (3.) The nominal returns of losses from regiments. (4.) The returns of officers and soldiers wounded or amputated, but remaining in the army, notwithstanding their amputations or wounds.

As to the classification adopted for tabulating the statistics thus collected, Dr. Chenu confesses that he had experienced difficulty in arranging it so as to satisfy the needs of correct anatomical distribution. The form of the classification at last adopted resembles the English classification, so far as the principles on which it is based are concerned. The principal divisions, like the English, are *regional*, the subdivisions *structural*. But although the French classification agrees in principle with Taylor's classification, it differs in its details. In the French Crimean history the injuries are classified in twenty-five divisions; the amputations and excisions in fifteen divisions. In the statistical history of the Italian campaign, the classification is altered in some minor respects. The number of classes is reduced from twenty-five to twenty-two. Wounds of the back and vertebral column, which form a separate class in the French history of the Crimean war, are distributed among the three classes of wounds of the neck, chest, and abdomen in that of the Italian war. Wounds of the face, the eyes, and the lower jaw, form three separate classes in the Crimean classification; they appear together

under one class, "wounds of the face," in the history of the Italian war. The subdivisions of all the classes are also modified in some particulars. As the work on the Italian campaign is the most elaborate as well as the latest published of these French professional histories, the classification adopted in it may be considered to be the most approved. I, therefore, insert it for purposes of comparison with the United States' and British classifications.

[illegible]

5. INJURIES OF THE ABDOMINAL REGION.	Contused wounds	
	Penetrating wounds	
	Undefined wounds	
6. INJURIES OF THE SACRO-LUMBAR REGION.	Contusions	
	Contused wounds	
	Complicated wounds	
7. INJURIES OF THE ILIAC & GLUTEAL REGION.	Undefined wounds	
	Contusions	
	Other injuries	
8. INJURIES OF THE INGUINAL REGION.	Contused wounds	
	Complicated wounds	
	Contusions	
9. INJURIES OF THE GENITAL ORGANS.	Herniæ	
	Contused wounds	
	Complicated wounds	
10. INJURIES OF THE ANAL REGION.	Contusions	
	Contused wounds	
	Complicated wounds	
11. INJURIES OF THE SCAPULO- HUMERAL REGION.	Contusions	
	Contused wounds	
	Complicated wounds	
	Undefined wounds	
	Luxations	
	Contusions	
	Other injuries	
	Carried forward	

16. INJURIES OF THE HAND.	Contused wounds	
	Fractures of metacarpal bones	
	" finger bones	
	Loss of finger	
	" phalanges	
17. INJURIES OF THE COXO-FEMORAL REGION.	Gunshot (penetrating ?)	
	Luxations	
	Contusions	
	Other injuries	
	Contused wounds	
18. INJURIES OF THE THIGH.	Fractures	
	Gunshot (penetrating ?)	
	Luxations	
	Contused wounds	
	" " with lesion of femur	
	Fractures of neck of femur	
	" great trochanter	
	" femur, upper fourth	
	" " upper third	
	" " middle third	
	" " lower third	
	" " lower fourth	
	" " condyles	
	" femur ?	
	Simple fractures	
	Gunshot (penetrating ?)	
	Contusions	
	Other injuries	
	Carried forward	

Classification of the injuries and surgical operations resulting from war in Germany.

It will be expected that I should say something with regard to German classification of the injuries resulting from war, but I am unable to do so, as no fixed classification exists. No field returns for recording numerically the several kinds of injuries inflicted in battle are employed in the German armies during war, nor is there in the German Army Hospital Regulations any authorised form for tabulating wounds according to their distinguishing features, analogous to the classification officially adopted in the English Army Medical Regulations.¹

Neither have official histories, either statistical or surgical, of the wars of 1864 and 1866, in which Prussia was engaged, been yet published. General-Arzt Dr. Loeffler, one of the most distinguished and industrious medical officers of the Prussian army, has published the first half of a work on the Danish war of 1864; and valuable detached papers of observations on particular groups of cases have been put forth by various eminent surgeons in monographs, but nothing approaching to a complete statistical record, in which the nature and result of every injury is comprised, such as was accomplished in the 'British History of the Crimean War' after Taylor's classification was adopted, has been achieved,

¹ Up to the year 1869 the general returns of the sick and wounded in the field hospitals made only a divisions of wounds into *leichte verwundungen* and *schwere verwundungen* (slight and severe wounds). See 'Reglement über den Dienst der Krankenpflege im Felde bei der Königlich Preussischen Armee,' Berlin, 1863, p. 467. In heavy and stationary hospitals an admission and discharge register was kept, in which the nature of the wound or sickness of each patient was required to be entered. The form of this register is shown at p. 332 of the foregoing regulations. The form of this admission and discharge register has been improved, and appears to have been made applicable to all field hospitals, light and heavy, in the new Prussian army medical regulations of 1869. See 'Instruktion über das Sanitätswesen der Armee im Felde vom 29 April, 1869,' Berlin, 1870, p. 327. But I have been informed from various quarters that this register during the late Franco-German war was only kept in the hospitals established in towns, or in others having a similarly stationary character.

or is, I fear, capable of being accomplished. It has been said by some German surgeons that the injuries resulting from war can be best classified after the war is over, from the documents collected at the stationary hospitals in which the patients have remained for some time under observation and treatment. But if nothing is done in the way of tabulating injuries and operations on some definite plan in all field hospitals, only after the patients have been transported to stationary hospitals, wherever they may be, what becomes, so far as the surgical statistics are concerned, of all those patients, whether subjects of surgical operations or otherwise, who remain for short periods of varying duration in the moveable hospitals, but who never reach any stationary hospital at all; how are they to be distinguished from the "killed in action?" One advantage of classified numerical returns furnished shortly after each engagement is, that all such cases will be included in them. They can be filled up quickly, all the casualties will be shown by each medical officer holding a charge on one common plan, essential distinguishing features are less likely to pass unnoticed, and it will be comparatively easy to combine the separate returns afterwards into one general return. These results can only be obtained under a pre-arranged and complete scheme of classification and tabulation emanating from central authority.

2. DIFFICULTIES IN THE WAY OF ESTABLISHING COMPARISONS BETWEEN THE STATISTICS TABULATED UNDER THE SEVERAL CLASSIFICATIONS BEFORE NAMED.

Having described the modes of classification adopted in England, the United States, and France, I wish now to call attention to the difficulty of comparing the statistics of one country with those of either of the others, in consequence of the different plans on which the classifications have been framed. It is obvious, at a first glance, that, even when two classifications are based on corresponding principles, if, in one instance, the number of *classes* into which the injuries

are divided is 12, while in another it is 24, an obstacle will be encountered in trying to establish a fair comparison between the results of some particular groups of injuries in the two sets of statistics. But when, further, the arrangement of the *orders* into which the classes are subdivided is different—subdivisions included in one that are not included in the other, orders common in name to both, but different in the special characters distinguishing them—it is evident that the obstacles will be increased, if they are not absolutely such as to render all just comparison impossible. This is what is found to happen in attempting to compare the results of injuries in many of the French with the English tables of the Crimean war. For example, in the English classification, all gunshot injuries in which the peritoneum is penetrated or perforated, by whatever route the projectile may have entered, would be included in *Class 5, Gunshot wounds of the abdomen; Order 3, Penetrating or perforating wounds*; while in the French classification, if the projectile entered from the perineum, it would be included in *Class 13, Wounds of the ano-perineal region*. In the English classification there is a special class, the 7th, for wounds of the perineum, genital, and urinary organs, but with this addition “not being at the same time wounds of the peritoneum;” and this single example, which is only one of very many others of a similar kind, will sufficiently serve to show the nature of the impediments which arise in trying to establish accurate comparisons between nominally similar groups of injuries in these two classifications.

These obstacles to fair comparison of course become still greater when one system of classification is based on different, *principles* from another, as the United States' system is with reference to the French and English systems. On turning, for example, to the English and French statistics of the Crimean war, it will be seen that in the former, out of 115 gunshot injuries of the abdomen, in which the peritoneal cavity was not penetrated, 22 deaths occurred, or 19.1 per cent., while in the latter, the French, the percentage of mortality in these non-penetrating wounds is shown to be

of the great American civil war when it appears. The surgeons in the field on the American system enumerate under gunshot fractures the number of fractures of the cranium, the first on the list of the eleven bones into which fractures are divided, but they make no distinction between the various kinds of cranial fractures included in the numbers under this heading. A gunshot fracture of the cranium with depression, but without penetration of the dura mater and opening of the arachnoid cavity, is an essentially different injury from one with penetration and opening of the arachnoid as to prognosis, the chance of success from trephining, and, indeed, in every respect of importance. So is one with lodgment of the projectile near the seat of opening, from another in which the projectile has passed into the encephalon. When all such injuries are tabulated together, as they are in the primary American returns, what useful information can be obtained from a table showing, for example, the results of the operation of trephining? In the British system of classification, these and all such important distinctions can be definitely marked; and the attention of the surgeons is forced to them because they are required to insert each case under one or other of the headings according to which it belongs. Too much praise cannot be awarded to the admirable monographs on "Amputations at the Hip Joint," and on "Excisions of the Head of the Femur for Gunshot Injury," which have resulted from the great United States' war; but it is manifestly to the personal zeal and devoted exertions of Surgeon Otis, under the instructions of Surgeon-General Barnes, that science owes these exhaustive treatises, much more than to the system of collecting information which was employed while the American soldiers referred to in them were under hospital care and observation. When the surgical history of the United States' war comes to be completed, its chief value will probably be found to consist in the information afforded by it on the remote effects of injuries and operative interference, owing to the pains which have been taken to follow up the cases of patients for years after the conclusion of the war, rather than in the general

statistics of the results of injuries and operations in their earlier periods. After soldiers have been discharged and pensioned in the British military service, there is no organization for keeping up acquaintance with their professional histories, nor, I believe, is there in the French service. This acquaintance appears to have been maintained, however, in the United States, as is evinced in the monographs I have already referred to on hip-joint injuries.

There is one point in the French classification to which I must just allude, and this is the large number of its principal divisions or classes. It must at once strike a critical observer that this outline distribution is inconveniently diffuse. The division of the surface of the body into so many sections militates against ready location of the injuries as they are brought under notice, and unnecessarily multiplies the subdivisions. The body is divided, according to the French classification, into twenty-two regional divisions, and yet it would be easy to show that these are not sufficiently numerous to satisfy scientific accuracy. To carry out the classification to such an extent in the main divisions as to satisfy all wants in this respect, would be totally to destroy that conciseness which is one of the prime objects of classification. It is much more convenient to locate the data for such scientific requirements in the subdivisions and minor tables. The requisite exactness of detail is fully arranged for in the orders, or subdivisions, of Taylor's classification, and under this arrangement can be furnished with comparatively little trouble. Any one who has carefully examined the British statistics of the Crimean war will have observed the close and methodical manner in which not merely the situations, but the special natures of all the injuries inflicted, have been recorded from the time when the cases were arranged in accordance with the plan of Inspector-General Taylor's classification.¹

¹ Dr. Chenu has given strong testimony to this fact in the 'French Medico-Chirurgical History of the Crimean War.' "I had finished my work," Dr. Chenu writes, "when I was fortunate enough to receive a similar one which had been prepared at London for the English army, and I have thus been able

I attribute this precision not to any superior ability on the part of the British as compared with the French or other surgeons, but mainly to the fact that the attention of the former was forcibly called to the distinctive characters of the injuries brought under their notice by the well-considered and well-arranged classification devised by Inspector-General Taylor; and, further, to the facilities of recording and tabulating the injuries according to this classification and its subordinate divisions by the printed forms which were provided for the medical officers, and which, after completion, were transmitted to the authorities for condensation into the general statistical tables.

The difference between the labour and cost of compiling the statistical and professional history of a campaign from documents furnished in the French and United States' systems, and from documents furnished on the English system, is worthy of notice. This difference will not only appear on investigation, but has been proved by experience.

It has been already mentioned that the only regular professional documents for furnishing the materials for such a history in the French service are the separate hospital

to furnish a translation of the numerous tables contained in it; but in order to facilitate comparison between the results in the two armies, I have endeavoured to give to these tables the form adopted for my own. I am compelled to confess that it has been impossible for me to attain the astonishing precision arrived at by our confrères of the British army. This precision, that one would scarcely get in our chief hospitals in France in time of peace, leads to the supposition that an admirable order, almost incredible, prevailed in the British ambulances and hospitals from the beginning of the campaign and during the whole period of the war; and if, as I dare not doubt, the statistics of the medico-chirurgical service of the British army in the East are scrupulously exact, it must be acknowledged that our British confrères have been much more able or more fortunate than we have been." 'Campagne d'Orient en 1854—56,' par J. C. Chenu, Paris, 1865, p. 12. Dr. Chenu, when thus writing, had evidently not noticed that no detailed statistics of the wounds and injuries which occurred in the British army among the non-commissioned officers and privates were attempted to be given from the opening of the war down to the spring of 1855, in consequence of the absence of that order which he presumes to have then existed, but which was subsequently fully established.

tickets or "Cahiers de Visite" employed in the ambulances and hospitals. Now, in order to sift, complete, and arrange the information supplied by these tickets, furnished as they were in a more or less incomplete state owing to the numerous hospitals through which many of the patients successively passed, Dr. Chenu mentions in his history of the Crimean war that he had to form fresh cards for each patient on a plan of his own. Examples of these cards are given in his work. He states also that he could only get these cards completed, so far as it was possible to complete them, after having filled up eleven hundred and fifty thousand of them, eighteen non-commissioned officers being employed for ten months as clerks to assist him in this proceeding. The labour on the American system is so great that an American friend once informed me that when he was at Washington there were 200 intelligent clerks employed in the surgeon-general's office in collecting and arranging the surgical statistics of the war, for the preparation and publication of which a very large sum of money has been liberally granted by Congress. Contrast these statements with the striking fact that the two folio volumes comprising the British medical and surgical history of the Crimean war were put together in the course of two years from the ordinary returns and reports of the military hospitals by two staff surgeons and one assistant surgeon,¹ without the aid of any clerks, and without any special grant of money; and that, up to the present time, the surgical history of no other war has equalled it in completeness and accuracy of details. By the English system, as Dr. Chenu has remarked, all the English army surgeons assisted in framing the voluminous professional report on the Crimean campaign; while the statistics in his work were the result of one man's labour, no corresponding help being given by the medical officers in charge of the ambulances and hospitals in the French army. In short, the English system is one of a general division of labour among all the surgeons actively employed, so that, so far as statistics are concerned, compara-

¹ The late Staff-Surgeons Matthew and Hanbury, and Assistant-Surgeon (now Staff-Surgeon) J. Fitzgerald.

tively little remains but to collate, unite, and add together the results of their individual records. The accuracy of the separate observations must depend upon the professional knowledge and acumen of the observers individually concerned; but it is to be remembered that administrative officers are employed not simply for collecting, but also, where necessary, for investigating the information supplied when open to doubt, and for procuring its correction when found to be faulty. An active and conscientious brigade or divisional inspector will constantly visit the field hospitals under his charge, and will obtain such an acquaintance with the cases treated by the surgeons acting under his directions, that few errors of importance ought to be allowed to exist in the returns transmitted through his medium to the head quarters of the army.

I am aware that full and correct statistics cannot be obtained under all circumstances in war. In cases of such overwhelming defeats as have occurred in the late war in France the collection of complete statistics would be simply impossible so far as the defeated armies are concerned. But the Geneva Convention, admitting as it does the professional staff of the field hospitals to remain with their patients without being made prisoners of war, gives a facility for a certain amount of hospital records to be preserved, even by the medical officers of a defeated army. The principal portion of the statistics should be got, however, from the hospital records of the conquering army. Were a common system of tabulating and classifying such statistics resolved upon, the natures of the wounds and injuries inflicted and the results of the treatment adopted for their cure or amelioration might be rendered with far greater precision than it can be under existing circumstances. Where no classified field returns of injuries and surgical operations are kept, how many wounded, as I have before alluded to, who are treated for days, perhaps weeks, near the scenes of action, and then succumb; how many important surgical operations performed under similar circumstances and leading to fatal results, must be wanting altogether in the statistical returns

afterwards put together when the war is over, the subjects of them appearing in the number of those who were killed on the battle field! And in such cases how much less valuable becomes the information tabulated, so far as ratios of fatal results and recoveries are concerned, whether of particular injuries or particular modes of operative interference. The importance of an established system of classification should not be decried because occasionally circumstances of difficulty occur which prevent it from being thoroughly carried into execution. On such circumstances occurring, the authorities will be able to explain the cause of the absence of the requisite information; under other circumstances, if a system of printed returns be established and issued for use, steps will be taken to ensure the returns being furnished.

4. NECESSITY FOR A COMMON INTERNATIONAL CLASSIFICATION.

These considerations naturally lead me to my last observation,—the desirability of an agreement being come to in different countries for classifying the injuries of war, the surgical operations they lead to, and their results, on one general system; so that not only the statistics of different modes of treatment or operative interference in particular injuries in one country may be reliably compared with each other, but that the sphere of investigation and comparison may be extended, and the opportunity of making similar observations be afforded with regard to the statistics of all countries in common. I need not enlarge on the necessity for such an accord; all that I have already said has tended to bring it to notice. It can only be achieved by an honest and thorough study of the several systems of classification which have already been employed, and of any suggestions that may be offered for improving one or other of them, joined with a mutual understanding to adopt that classification which may be ultimately found to be the most practically useful. Would not the attainment of such an object be a legitimate and worthy task for an international committee of competent

delegates, appointed either by the army medical departments and governments of the countries respectively concerned, or selected by societies having a corresponding professional influence in them with that which the Royal Medical and Chirurgical Society holds in this country?

A CASE
OF
BONY ANKYLOSIS OF THE KNEE-JOINT

TREATED BY
SUBCUTANEOUS SECTION OF THE BONE.

BY
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COMMUNICATED BY
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COMPLETE or bony ankylosis of the knee is a rare affection, the majority of cases which at first sight appear to be of this nature being generally found, when the patients are placed under chloroform, to be cases of fibrous union. The diagnosis is not always easy or certain. The amount of force which is often applied to break down a supposed fibrous adhesion may possibly break the uniting bone, which is always of a loose character, and the case thus wrongly passes for one of firm fibrous union.

Such cases of false ankylosis are successfully treated either by gradual or sudden extension, often with tenotomy. In the following case of true ankylosis the bone was divided

subcutaneously, apparently with no more risk or suffering to the patient than accompanies the division of a tendon.

E. L—, aged 14, had been under observation at the London Hospital three years. She had always been a feeble, querulous, ill-nourished child. When first seen at the hospital both knees were contracted to about a right angle and the patient moved about on her knees. This deformity was in the right knee, the result of strumous disease when the child was five years old. There had been free suppuration for many months from many sinuses, the limb had become bent, the tibia dislocated backwards under the femur, and firmly fixed in that position. The skin over the knee was marked by many cicatrices and in places adherent to the bone. The muscles of the limb, especially of the leg, were much wasted, and the foot could not be thoroughly flexed.

The left leg was bent to about the same angle and apparently ankylosed, but without any deformity or appearance of dislocation about the joint. The child's mother stated that there had never been any pain or swelling in this knee; that it gradually became drawn up whilst the child was confined to bed with the disease in the right knee, and that when the child became convalescent, she found that both knees were fixed in the flexed position.

Such was the condition in which the girl was admitted an out-patient of the hospital under my care, extension instruments were applied and their use continued for some months, not very assiduously and without any benefit, mainly in consequence of the carelessness of the mother. The girl was then admitted as an in-patient, when I decided on trying the effect of forcible extension. The patient was placed under chloroform, and with some considerable amount of force the adhesions in the left knee were broken and the limb somewhat straightened, the extreme tension of the hamstrings preventing further immediate extension. This limb was placed in an instrument to preserve the amount of extension already gained.

The right knee was perfectly rigid and no impression was made on it by all the force two persons could employ.

As after a week's time the operation on the left knee was not followed by any inflammation or swelling, the hamstring tendons were divided. Three days later extension was commenced, and in four weeks the left leg became perfectly straight. The knee was stiff and there seemed no prospect of regaining motion. The girl could now walk with crutches, and was again made an out-patient. Before proceeding to any operation on the right knee, which would necessarily be attended with some risk, I decided to try again the effect of a powerful and well-adjusted extension instrument. Such an instrument was applied, and the girl continued its use as an out-patient till October 29th, 1868, when she was again admitted into the hospital.

Whilst an out-patient for the second time, she had been twice placed under the influence of chloroform, and every effort had been made to break down the uniting medium between the bones, but ineffectually, the limb remained at a right angle.

This deformity, as it entirely destroyed the usefulness of the member, rendered further measures not only justifiable but desirable. A serious operation, such as severing a wedged-shaped piece of bone, seemed out of the question, considering the feeble state of the girl's health; but as a subcutaneous operation, though possibly not successful, would probably be attended with little risk, I determined to attempt the division of the bone somewhat after the method of Professor Gross, of Philadelphia.

The girl was placed under chloroform on the 11th of November, 1868. To make the necessity of operative interference apparent and certain, I endeavoured with an assistant, using all our might to straighten the limb, but ineffectually. An incision the third of an inch long was therefore made down to the bone, through healthy skin on the outside of the knee, over the lower border of the outer condyle femur, about midway between the anterior and posterior aspects of the limb.

Owing to the changes in the positions of the bones it was impossible to ascertain the relations of parts with great

exactitude. A strong carpenter's chisel rather less than a quarter of an inch wide was inserted in the wound and driven with a mallet through the united bones towards the inner side of the knee, until its point was felt with the finger under the integuments on the opposite side. The chisel was then withdrawn from the bone (with some difficulty), but not taken out of the wound and was driven through again, so that its point emerged somewhat higher, i.e. nearer the anterior surface of the limb than before. This proceeding was repeated several times in different directions in the same plane. The last time the chisel was driven backwards as far as was thought consistent with the safety of the popliteal vessels. The chisel was now withdrawn, as nearly all the bone was considered to have been divided; the union still seemed firm, but gave way on the application of some force. The tibia was now freely movable on the femur, but the limb could not be straightened, owing to the contraction of the soft parts at the back of the joint. The hamstring tendons were next severed, as they offered some resistance and because their division would facilitate further extension, and allow the limb to remain more completely at rest after the operation. It was not considered advisable to straighten the limb at once by force, as probably, the bony union having been broken, the soft parts at the back of the limb would now yield by means of gradual extension. As blood was escaping freely from the wound, a pad of lint and a bandage were applied, and the limb was placed on a splint adjusted to the angle to which it adapted itself without tight bandaging or strapping. Fifteen drops of laudanum were ordered to be given at bedtime. During the next few days the girl complained a good deal of pain in the knee, but as she took food and wine well, and had no constitutional symptoms an examination of the limb was not made until the sixth day, when the bandages were removed. The wound was found closed but not healed, a good deal of blood had oozed out after the operation and prevented immediate union. There was no swelling, redness, or pain on pressure in any part of the knee. The leg was now placed on the extension apparatus

and was at once slightly straightened, the extension being increased a little more every day.

The girl continued well, and three weeks after the operation she could put her foot to the ground and commence walking with crutches. These she soon discarded and a fortnight later walked quickly and painlessly, though with lameness.

The subject of the above case had been for so long a patient at the hospital as to have become a reproach to surgery. It had therefore become necessary that something more should be done, or that the case should be declared incurable. The persistence with which the child attended as an out-patient showed that she felt thoroughly the inconvenience of the deformity, and that her relatives were very desirous that some further attempt at restoration be made. She was a delicate girl and not a fit subject for such an operation as the removal of a wedge-shaped piece of bone, which is moreover an operation which has often proved fatal in such cases. The skin over the knee was in many places adherent to the bone and half made up of cicatrices, and would therefore very likely have sloughed after that operation.

The careful separation with a small chisel and a mallet of the firmly united femur and tibia with as small an opening in the integuments as possible, and the smallest practicable exposure and disturbance of the surrounding parts, offered itself to my mind as beyond comparison the best and safest mode of operative procedure.

Reflexion on the probable inferior density of the osseous connecting medium in the situation where the articulation once existed as compared with the average density and hardness of the shaft of a long bone, such as the femur, led to the conviction that the united bones could be separated by chisel and mallet, and that separation by a saw such as I have employed in former divisions of long bones (tibia, fibula, and radius) for the cure of deformities ought to be discarded in this situation. In fact, the sawing asunder of the ankylosed bones of a former knee joint is simply impracticable by a subcutaneous proceeding. The result of the treatment related above was satisfactory, as the girl could walk easily

without assistance. Possibly a greater degree of straightening might have been gained by more vigorous after-treatment and by greater force immediately after the section of the bone. The violence to which the knee was necessarily subjected by the operation made it appear dangerous to increase the risk of inflammation by forcibly tearing the connecting soft parts away. Then again, as the hamstring tendons were cut, immediate straightening might have caused too great separation of their divided ends with future impairment of function, as even with a stiff knee these muscles remain of great use in standing and walking. Experience may show that some of these fears and precautions were chimerical. Indeed so complete was the absence of all inflammation after the operation that this solitary case appears to indicate that perfect removal of the deformity might very likely have been attained if more considerable straightening had been carried out sooner after the operation. The satisfaction at the result obtained from the performance of a novel operation of this nature more than compensated me for any regret that the straightening obtained was not more complete, and that the deformity was not entirely removed.

A more violent extension applied to the soft parts might have been attended with the well-known accidents of sudden forcible extension recorded to have occurred in many instances, in which without osteotomy a partially ankylosed knee has been too suddenly straightened. After an artificially produced solution of continuity of a considerable bone analogous to a "compound fracture" such as this operation, the surgeon may justly sacrifice for sound reasons the obtainment of a perfectly straight member, remembering especially that where the formation of a new false joint, that dream of the operative surgery of joints, is not expected, an absolutely, straight, stiff limb, although more slightly, is not necessarily so convenient and therefore so useful a member as one fixedly bent a few degrees.

This case is, I believe, the first instance of subcutaneous osteotomy for the relief of a completely ankylosed large joint performed in this country.

ON THE
REMOVAL OF TUMOURS FROM BONE.

BY

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I do not doubt that many surgeons have removed tumours growing in bones by extirpating or enucleating them from the cavities in which they lay, yet I believe that the practice has never been generally approved; it has been and is thought, at the best, sometimes permissible. The belief seems to be that when a tumour grows in a bone, the proper course is to cut away more or less of the bone together with the tumour, even although this may involve the loss of a limb, or some great deformity such as that due to the removal of a piece of the whole depth of the lower jaw, or the whole of an upper jaw, including its alveolar border with the teeth.¹ Many cases, however, have convinced me that the operation of simply removing a tumour from the place in which it lies is as sufficient for the cure of one growing in a bone as for

¹ Illustrations of this general belief may be found in considerable numbers in any large pathological museum.

that of one growing in connective tissue, and that the instances are very few in which it is right to disturb the continuity of a bone in order to remove from it any innocent tumour.

On pathological grounds this practice ought to be right for all the non-cancerous tumours which, growing as circumscribed masses within bones, expand them into shells or cases. For these, to many of which the name Endostosis, or Osteosarcoma centrale, has been given, are, in all their connections with surrounding parts, just like the fatty, fibro-cellular, glandular, and other tumours which, growing in soft textures, expand them and are so loosely associated with them that they may be cleanly shelled-out. In the cases of these tumours in soft parts, the practice is to excavate or enucleate the tumour from the space containing it: so should it be for nearly all the tumours of the same class growing in bones.

In illustration of the practice I give the following cases selected from many of the like kind.

CASE 1.—A lad of 16, with good general health, was admitted, in 1865, into St. Bartholomew's Hospital, with a swelling just below the tubercle of his tibia, which he had observed increasing for eighteen months, and rapidly during the last six. The swelling presented a smoothly rounded surface, bulging from the front of the tibia, rising about two thirds of an inch, and measuring about two inches across. The surface yielded a little, and without pain, to firm pressure; its borders were the hard walls of the tibia. There was no other appearance of disease.

Believing that this was either a myeloid, or, more probably, a cartilaginous, tumour within the upper part of the tibia, I uncovered it by reflecting a semicircular flap of skin, and cutting open the subjacent periosteum. I was then able to remove with a gouge a mass of compact semi-transparent cartilage nearly two inches in diameter, in general and minute characters just like ordinary foetal cartilage. The cavity in the tibia in which it was lodged was bounded by smooth, hard bone, and was about an inch deep.

No serious trouble follows the operation. The wound slowly healed, with a scar depressed deeply into the cavity into the tibia, and within the last six months I have seen the patient in perfect health, in no degree damaged by the operation.

CASE 2.—In 1865 I removed a similar cartilaginous tumour from the lower jaw of a lady, 45 years old. It had been growing during two or three years, extended along the space between the first bicuspid and last molar teeth, was deep set in the jaw, expanding both the walls, and rising to about the level of the molar teeth. I gouged it out, leaving the base of the jaw untouched and not cutting any part of the cheek or lip.

The patient has remained well since the operation, and has no outward appearance of anything having been done.

CASE 3.—A woman of 40 has lately left St. Bartholomew's, who was admitted eight weeks ago with a large tumour at the lower end of the right radius, which had been observed for about five years, and in the last year had quickly increased, ulcerated, and given great pain. The tumour, projecting chiefly from the outer and dorsal part of the forearm, immediately above the wrist, was of irregularly globular form, coarsely nodular, very firm and tense, about three inches in its chief diameters. The wall or periosteum of the radius appeared continuous over its surface. The integuments over it were dusky, congested, hot, and in two places widely ulcerated. The wrist-joint was free, but its movements and those of the fingers were hindered as if by the bulk of the tumour, and its displacement of tendons.

There was no difficulty in making the diagnosis of a cartilaginous tumour growing in and protruding from the lower end of the radius; but it seemed doubtful whether the tumour could be so excavated from the bone as to leave anything that would maintain the length and firmness of the forearm, and not spoil the wrist-joint. It was judged right to make the attempt.

The tumour was exposed by a long incision along the

direction of the extensor tendons of the thumb and the removal of the ulcerated portion of the integuments in this direction. On uncovering the tumour it appeared that the greater part of it was protruded from the radius, or only thinly covered by its outstretched periosteum. The lower end of the radius was filled with the smaller part of the tumour, a mass rather more than an inch in diameter, by which its walls were thinned and extended, and its articular cartilage nearly uncovered. The protruding part of the tumour was broken off, and then that which was within the radius was gouged out. A very thin shell of bone and periosteum was left, widely open at its outer and dorsal part. The radio-carpal articulation also was laid open by the breaking away of the radial articular cartilage from the thin shell of remaining bone.

The hand and arm were put on a splint, and constantly irrigated for many days. Parts of two of the short extensor tendons of the thumb sloughed away; but there was no serious hindrance to the healing of the wound, and the hand appears likely to become completely useful.

CASE 4.—A healthy lad, 19 years old, was under my care in St. Bartholomew's in January, 1861, with a swelling on the left side of the face, which pushed his eyeball nearly half an inch upwards, and the lower border of the orbit and the lower and front part of the antrum as much forwards. The nasal cavities, palate, alveolar border of the jaw, and the teeth, all appeared sound. The swelling was enclosed by the bony walls of the antrum in every part except the floor of the orbit, where a very firm, elastic, roundish tumour could be felt distinctly pulsating. The swelling was not painful and all the textures adjacent to it were quite healthy. It had been observed for seven years, and projected first in or just below the orbit.

It was sufficiently clear that there was in this case a fibrous or a myeloid tumour pulsating at its place of escape from the bony investment of the walls of the antrum.

I cut through and raised the cheek from the whole front of

the upper jaw, then cut away all this part of the jaw and the lower border of the orbit, but without touching the alveolar border or the teeth. Part of the front of the tumour growing from the inner surface of the anterior and inner wall of the antrum was thus removed. The rest of its attachments were then cut away, and its posterior part was easily enucleated from the soft structures of the orbit and spheno-maxillary fossa on which it lay imbedded.

The tumour was an oval, tuberos mass, from two to three inches in its several diameters, very dense, heavy, elastic, and perfectly defined. It consisted throughout of close, compact white fibrous tissue.

The healing of the wounds was tedious but not attended with danger, and, the teeth being undisturbed, the consequent deformity was very slight.

The patient, as I am informed by Mr. Isbell, of Ross, who sent him to me, has remained to this time in perfect health.

CASE 5. [I am indebted to Mr. Wrench, of Bakewell, for the notes of this case.]—E. W—, aged 43, a married woman, childless, very stout, and rather hysterical, was always (as she thought) healthy, till, in March, 1868, she believed she sprained her left wrist. Soon after this time she felt pain in the wrist, and then swelling appeared and she was treated with leeches, blisters, &c., as for a sprain.

Mr. Wrench saw the case first in July, 1869. There was then considerable enlargement of the lower two inches of the radius, and in all this part pulsation could be distinctly felt and seen, but could be stopped by pressure on the bronchial artery. The hand was nearly useless, and the pain constant.

In the belief that the swelling was due to aneurism in the bone, ice was applied and digital compression of the brachial artery, and on August 5th this artery was tied. For some months the swelling lessened, the pain ceased, and the hand was again useful. In December, however, all the old symptoms reappeared, and Mr. Paget, in the belief that the

swelling was due to a pulsating myeloid tumour within the distal end of the radius, recommended its enucleation.

The operation was performed by Mr. Wrench at the end of 1869. An incision four inches long was made over the radius, between the tendons of the extensors of the thumb, and a part of the tumour was exposed covered only with periosteum. The tumour was too friable to be removed entire, but it was all easily broken down with the finger, and removed from the irregular cavity which its deeper-seated part occupied in the end of the radius. The wrist-joint was not exposed, and no vessel required ligature.

Severe inflammation at and about the seat of the operation ensued, and very free suppuration, but in about two months the wound was very nearly healed, and at the end of a year only a small sinus remained, through which it seemed likely that a portion of dead bone might come. All pain had ceased; the destroyed part of the radius appeared to be replaced by firm new bone; there was no enlargement, and only very slight deformity at the wrist, and the hand was becoming constantly more useful. The movements of the wrist and of all the fingers were restrained, but none were lost and all were improving.

CASE 6.—In October, 1868, I saw with Mr. Edgar Barker, jun., a patient, 15½ years old, who had a considerable swelling at the right angle of his lower jaw. This had been observed for only two months, but attention has been drawn to it chiefly because of suppuration which had occurred in it about the time when it was first observed. The swelling was smoothly rounded, not painful, bounded everywhere by bone except at the gum; and here a small opening, through which some pus escaped, would admit a probe into contact with bare bone.

The case appeared to be one of expansion of the angle of the jaw around a suppurating capsule of the last molar tooth, and with Mr. Barker's help I intended, with a gouge, to lay the cavity open through its alveolar wall. But I found that the swelling was due to a circumscribed bony tumour, which

with some difficulty, I enucleated. It was from two thirds to three fourths of an inch in its diameter, and composed of hard, finely cancellous bone, around which the walls of the jaw were extended.

No serious consequences followed the operation. The swelling subsided, and the patient remains well.

These cases, to which I could add several more, are enough to prove the sufficiency and safety of simply removing innocent tumours, of whatever kinds, from bones. The sufficiency is established by the times that have elapsed since the operations without any recurrence of disease; times which, in even the shortest cases, are more than would have passed if recurrence should have happened in consequence of incomplete removal of disease. And I have seen no reason to doubt that the safety of removing a tumour from within a bone is greater than that of any resection or amputation that might have been performed as an alternative operation.

It is hardly necessary to describe how tumours should be enucleated from bones. A tumour, being very freely exposed in any way that its size and situation may make most advisable, may be enucleated with the finger or a gouge, and with gouges of various sizes any portions that lie in recesses from the main cavity in the bone may be scooped out. Of course, if it be possible, every portion of the tumour should be removed, but there need be no fear of recurrence from the growth of microscopic remnants, and it is not necessary to cauterize the walls of the bone-cavity which contained the tumour.

The only real difficulty is to make a correct diagnosis of the cases for which the different operations for the removal of tumours growing in or on bones are severally appropriate. For cancerous and recurrent tumours, amputation or wide resection is generally advisable; for innocent tumours growing on bones, excision; for innocent tumours growing in bones, enucleation.

For help to the diagnosis necessary for choosing the right

operation for bone-tumours I venture to offer these conclusions from many observations.

1. The tumour is probably cancerous if its growth commenced before puberty or after middle age, unless it be a cartilaginous or bony tumour on a finger or toe or near an articulation.

2. If a tumour has existed on or in a bone for two or more years, and is still of doubtful nature, it is probably not cancerous or recurrent, and this probability increases with the increasing duration of the tumour.

3. If a tumour on or in a bone has doubled or more than doubled its size in six months, and is not inflamed, it is probably cancerous or recurrent, and this probability is increased if, among the usual coincidences of rapid growth, the veins over the tumour have much enlarged, or the tumour have protruded far through ulcerated openings and bleeds and profusely discharges ichor.

4. If with any such tumour, not being inflamed, the lymph-glands near it are enlarged, it is probably cancerous, and still more probably if the patient have lost weight and strength to amounts more than proportionate to the damage of health by pain, or fever, or other accident of the tumour.

5. A tumour on the shaft of any bone but a phalanx is rarely innocent, and so are any but cartilaginous outgrowths on the pelvis, or any but the hard bony tumours on the bones of the skull.

If on the concurrence¹ of these characters, or on other grounds, it is in any case concluded that a tumour connected with a bone is not cancerous or recurrent, the question whether it is growing on or in the bone may be probably determined by the following general rules.

When the wall of the bone can be traced over the surface, or any part of the surface, of the tumour, its growth from within is nearly certain. And so it is when, on the surface of the tumour, portions of bone can be felt among portions of more yielding substance. General smoothness of surface

¹ I say "concurrence," for in these, as in all other instances, there is no one sign which can be always or absolutely relied on for diagnosis.

is usually significant of a tumour growing within a bone and expanding it, unless in the case of cartilaginous tumours, which after growing within bones, have protruded through some part of their expanded walls. Pulsation in a non-cancerous tumour connected with bone is a nearly certain sign of growth within bone, except in the case of certain specimens of myeloid epulis; and when such pulsation is felt it is no indication that severe bleeding will ensue in the removal of the tumour, for it is only derived from the arteries on the walls of the bone-cavity lodging the tumour.

When these means of diagnosis are insufficient, an exploratory puncture or incision may be made; and, generally, in cases of doubt, it may be well to attempt the simple removal of the tumour, and in case of failure to proceed at once to its excision or to resection or amputation.

A FOURTH SERIES
OF
ONE HUNDRED CASES OF OVARIOTOMY,
WITH REMARKS ON THE
DIAGNOSIS OF UTERINE FROM OVARIAN TUMOURS.

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Received April 11th.—Read June 13th, 1871.

NEARLY two years ago a paper entitled "A Third Series of One Hundred Cases of Ovariectomy, with Remarks on Tapping Ovarian Cysts," was read before this Society, and was afterwards published in the fifty-second volume of the 'Transactions.' In that paper, and in others published in the forty-sixth, forty-eighth, and fiftieth volumes, every case in which I have completed the operation of ovariectomy, and every case where I have commenced but have not completed it, or have made an exploratory incision when the diagnosis was doubtful, have been arranged in tables from the first to the three hundredth case.

I have now the honour of bringing before the Society a fourth series of one hundred cases in which ovariectomy was completed, six cases where it was commenced but not completed, and seven cases where an exploratory incision was made. The tables are arranged in the same form as in previous papers.

TABLE OF CASES.

SERIES I.—Cases in which Ovariectomy was completed—100 cases : 78 recoveries, 22 deaths.
 " II.—Cases in which Ovariectomy was commenced, but not completed—6 cases : 2 relieved or cured,
 4 died.
 " III.—Cases where an Exploratory Incision was made—7 cases : 5 recovered from incision, 2 died.

Series I.—Cases in which Ovariectomy was completed.

No.	Medical attendant.	Date.	Age.	Condition.	Adhesions.	Treatment of pedicle.	Weight of fluid or tumour.	Length of incision.	Result.
							Pounds.	Inches.	
301	Hospital	1869 Jan.	49	Married	Parietal. Ruptured cyst	Pins and ligature	27	6	Recovered.
302	Hospital	Feb.	41	Married	Parietal	Clamp	49	6	Recovered.
303	Mr. Ewen, Wibeach	Feb.	25	Single	None	Clamp	12	4	Recovered.
304	Dr. Jackson, Oxford	Feb.	49	Married	Parietal	Clamp	21	7	Recovered.
305	Dr. Gream	Feb.	55	Single	Parietal and pelvic	Clamp and ligatures	23	7	Died, 26 hours.
306	Hospital	Feb.	29	Married	Parietal, omental, & intestinal	Ligature	39	7	Died, 4th day.
307	Hospital	Feb.	48	Widow	None	Clamp	41	4	Recovered.
308	Hospital	Feb.	49	Married	Parietal and pelvic—Both ovaries	Clamp and ligature	19	5	Recovered.
309	Hospital	March	40	Married	Parietal	Pins and ligature	36	9	Died, 50 hours.
310	Hospital	March	59	Married	None—Burst cyst	Clamp	11	6	Recovered.
311	Dr. Lendam	April	38	Widow	Omental	Clamp	13	5	Recovered.
312	Hospital	April	54	Single	Parietal and omental	Clamp	12	5	Died, 6th day.
313	Hospital	April	35	Single	Parietal & mesenteric	Clamp	13	5	Died, 7th day.
314	Dr. Oldham	May	25	Single	None	Clamp	18	4	Recovered.
315	Mr. Squire	May	20	Single	None—Burst cyst	Clamp	13	5	Recovered.
316	Mr. Stevens, Christchurch	May	36	Single	Parietal and omental	Clamp	40	5	Died, 4th day.

317	Mr. Livy, Bolton	May	30	Single	None	Clamp	9	4	Died, 5th day.
318	Dr. Ridley, Canada	May	38	Married	None	Cantury	13	4	Recovered.
319	Hospital	May	22	Single	None. Both ovaries.	Clamp and ligature.	11	4	Recovered.
320	Dr. Braxton Hicks	May	39	Married	Omental and pelvic— Both ovaries	Clamp and ligature.	20	6	Recovered.
321	Sir W. Jenner, Bart.	June	27	Married	None	Clamp	19	5	Recovered.
322	Hospital	June	24	Married	Parietal and pelvic— Both ovaries	Ligatures	23	8	Died, 28 hours.
323	Dr. Nethe, Neuhalddenleben.	June	42	Married	Intestinal	Clamp	26	6	Recovered.
324	Dr. Fitzpatrick	June	30	Single	Omental—Burst cyst	Clamp	13	4	Recovered.
325	Dr. Quain	June	50	Single	Parietal and pelvic— Burst cyst	Clamp	9	5	Died, 17 hours.
326	Dr. Burrows	June	47	Married	Omental & intestinal	Clamp	26	6	Recovered.
327	Dr. Greenbald	June	48	Married	Omental and parietal —Burst cyst	Clamp	23	6	Died, 3rd day.
328	Hospital	June	41	Married	None	Ligature	18	4	Died, 3rd day.
329	Hospital	June	27	Married	Parietal and omental	Clamp	23	6	Recovered.
330	Mr. Bateman	Aug.	33	Married	Omental—Burst cyst —Pregnancy	Clamp	37	7	Recovered.
331	Mr. Corner, Poplar	Aug.	30	Single	Parietal, omental, and intestinal	Clamp	22	6	Recovered.
332	Mr. Symonds, Oxford.	Aug.	54	Single	None	Clamp	22	5	Recovered.
333	Mr. Clarke, Huddersfield	Sept.	23	Single	None	Clamp	6	4	Recovered.
334	Hospital	Oct.	32	Single	None	Clamp	17	4	Recovered.
335	Dr. Gervis	Oct.	37	Single	None	Clamp	6	4	Recovered.
336	Hospital	Oct.	43	Married	None—Burst cyst	Clamp and ligature.	20	6	Recovered.
337	Hospital	Nov.	26	Single	Parietal and omental	Clamp	21	4	Recovered.
338	Dr. Case, Farham	Nov.	18	Single	None	Clamp	16	3	Recovered.
339	Dr. Rayner, Stockport	Nov.	31	Married	None	Clamp	21	4	Recovered.
340	Hospital	Nov.	46	Married	Parietal & intestinal	Clamp	24	6	Died, 26 hours.
341	Hospital	Nov.	29	Single	Intestinal	Ligature	19	4	Recovered.
342	Hospital	Dec.	35	Single	None	Clamp and ligature.	14	4	Recovered.
343	Dr. Bamakill	Dec.	54	Married	Omental	Clamp	16	4	Recovered.
344	Hospital	Dec.	51	Married	Omental & intestinal	Cantury and ligature	13	6	Recovered.

No.	Medical attendant.	Date.	Age.	Condition.	Adhesions.	Treatment of pedicle.	Weight of fluid or tumour.	Length of incision.	Results.
		1870					Pounds.	Inches.	
345	Mr. Crompton, Birmingham...	Jan.	39	Single	Pelvic	Clamp and ligature...	13	5	Recovered.
346	Dr. Symonds, Clifton...	Jan.	48	Single	Parietal	Clamp	24	5	Recovered.
347	Hospital	Jan.	42	Married	Parietal and omental	Clamp	23	5	Recovered.
348	Dr. West...	Jan.	34	Single	To cecum	Clamp and ligature— Both ovaries	12	3	Recovered.
349	Hospital	Jan.	24	Single	Omental and parietal	Clamp	33	4	Died, 4th day.
350	Hospital	Feb.	47	Widow	Parietal	Clamp and ligature...	23	5	Died, 39 hours.
351	Sir J. Alderson	Feb.	40	Single	None	Clamp	16	4	Recovered.
352	Mr. Cockcroft, Darlington	Feb.	28	Married	None	Clamp	28	4	Recovered.
353	Dr. Priestley	Feb.	20	Single	None	Clamp and ligature— Both ovaries	18	4	Died, 5th day.
354	Hospital	March	22	Single	Omental	Clamp	33	8	Recovered.
355	Sir W. Jenner, Bart.	March	63	Widow	Omental	Ligature	42	6	Died, 6th day.
356	Hospital	March	48	Married	None	Clamp	11	4	Died, 4th day.
357	Hospital	April	37	Married	None	Clamp	17	6	Recovered.
358	Mr. Beckingsale, Newport	April	53	Married	Omental & intestinal	Clamp and ligature...	35	6	Died, 18th day.
359	Dr. Evans, Birmingham	April	61	Single	Omental, intestinal, and parietal	Clamp	33	6	Recovered.
360	Hospital	April	32	Married	Omental	Clamp	29	6	Recovered.
361	Mr. Tweddell, Houghton-le- Spring	April	46	Married	None	Clamp	22	5	Recovered.
362	Hospital	April	22	Married	Omental	Ligature	6	5	Recovered.
363	Dr. Gull	May	53	Widow	None	Clamp	21	5	Recovered.
364	Mr. Barkway, Bungay	May	42	Married	Parietal and omental	Clamp	18	5	Recovered.
365	Hospital	May	45	Married	Parietal	Clamp	56	6	Died, 3rd day.
366	Hospital	May	27	Single	Parietal and omental	Ligature	11	5	Recovered.
367	Dr. Kinneir, Malmesbury	May	29	Single	None	Clamp	22	5	Recovered.
368	Dr. Miller, Blackheath	May	25	Married	Parietal	Clamp	17	5	Recovered.
369	Hospital	May	47	Married	Parietal and omental	Clamp	27	6	Recovered.

370	Hospital	June	33	Married	None	Clamp	15	5	Died, 32 hours.
371	Dr. Welch, Southampton	June	34	Married	None	Clamp	28	6	Recovered.
372	Dr. Collyer, Enfield	June	28	Married	None	Clamp	30	7	Recovered.
373	Dr. Unna, Hamburg	June	44	Married	Omental and pelvic	Ligature	6	7	Recovered.
374	Hospital	June	40	Single	None	Clamp	12	6	Recovered.
375	Hospital	June	32	Married	Parietal	Clamp	7	6	Recovered.
376	Hospital	July	32	Married	Parietal and omental	Clamp	22	6	Recovered.
377	Mr. Pyne, Royston	July	42	Married	None	Clamp	28	5	Recovered.
378	Hospital	July	38	Single	Omental	Clamp and ligature— Both ovaries	16	5	Died, 4th day.
379	Dr. Cole, Bath	July	27	Single	None	Clamp	10	5	Recovered.
380	Dr. West	Aug.	18	Single	Omental	Clamp	16	5	Recovered.
381	Dr. Swain, Birmingham	Aug.	29	Single	None	Clamp	21	4	Recovered.
382	Hospital	Aug.	31	Married	Omental	Clamp	21	5	Recovered.
383	Mr. Belcher, Burton	Aug.	26	Single	None	Clamp	25	5	Recovered.
384	Mr. Godson	Aug.	43	Widow	Parietal	Clamp	29	5	Recovered.
385	Hospital	Aug.	24	Single	Omental	Clamp	28	5	Recovered.
386	Mr. Roberts, Portmadoc	Oct.	53	Married	None	Clamp	13	5	Recovered.
387	Dr. Orsborn, Bittern	Oct.	59	Widow	Parietal	Clamp	11	5	Recovered.
388	Dr. Smith, Weymouth	Oct.	52	Single	None	Clamp and ligature— Both ovaries	24	5	Recovered.
389	Hospital	Oct.	36	Married	Parietal	Clamp	11	5	Recovered.
390	Mr. Gibson, Norwich	Oct.	63	Single	Parietal	Clamp	28	5	Recovered.
391	Hospital	Oct.	53	Married	None—Burst cyst	Clamp	44	5	Died, 35 hours.
392	Hospital	Oct.	42	Married	Parietal	Clamp	47	5	Recovered.
393	Hospital	Nov.	30	Single	None	Clamp	7	5	Recovered.
394	Dr. Prince	Nov.	50	Single	Parietal	Clamp	11	5	Recovered.
395	Dr. Smith, Weymouth	Nov.	51	Widow	None	Clamp	23	5	Recovered.
396	Hospital	Nov.	23	Single	Parietal and omental	Clamp	7	5	Recovered.
397	Mr. Morris, Edmonston	Nov.	50	Married	None—Burst cyst	Ligature	...	5	Recovered.
398	Hospital	Dec.	65	Married	Parietal, omental, and intestinal	Clamp	66	8	Recovered.
399	Mr. Goddard	Dec.	29	Married	None. Pregnant	Clamp	15	5	Recovered.
400	Dr. Thetford	Dec.	34	Married	Parietal—Burst cyst	Clamp	28	5	Recovered.

Series II.—Cases in which Ovariectomy was commenced but not completed.

No.	Medical attendant.	Date.	Age.	Condition.	History, &c.	Results.
1	Dr. Royston	1869 Feb.	53	Widow	An adherent multilocular ovarian cyst opened, fixed to the abdominal wall, and drained.	Died, 20th day.
2	Mr. Jones, Epsom	Feb.	54	Single	Peritoneal fluid removed, and a burst adherent cyst completely emptied. Nothing more done, as cancerous nodules were scattered all over the peritoneum.	Died, 3rd day.
3	Hospital	May	34	Married	Peritoneal fluid removed. Adherent papilloma of both ovaries left undisturbed.	Left hospital, 25 days after.
4	Mr. Erichsen	May	54	Single	Part of a large adherent multilocular cyst removed. Adhering pelvic portions left, ligatures maintaining drainage.	Died, 8th day.
5	Dr. Bacelli, Rome	1870 Nov.	31	Married	Part of an adhering cyst removed. Remaining portion secured by ligature, the ends keeping up drainage.	Died, 22 hours.
6	Dr. Budd, Clifton	Dec.	26	Single	Adherent cyst of right ovary or broad ligament opened, emptied, fixed to abdominal wall, drained, and cure obtained by suppuration.	Recovered.

Series III.—Cases where an Exploratory Incision was made.

OVARIOTOMY.

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1	Mr. Turner, Manchester...	1869 June	24	Single	A large solid glandular or fibro-plastic tumour exposed, but not disturbed.	Recovered and returned home, but died 13 months after.
2	Hospital	Nov.	26	Married	Ascitic fluid removed. Small tumour of left ovary and large uterine fibroid, not disturbed.	Recovered, and left hospital on 17th day.
3	Hospital	1870 Feb.	30	Married	Forty-five pints ascitic fluid removed. Papilloma of both ovaries involving uterus, not disturbed.	Died 40 hours after incision. The tumour apparently sprang from the peritoneal coat of the uterus.
4	Hospital	Feb.	26	Married	A fibro-cystic tumour exposed and examined. Perchloride of iron and twisted suture used to stop bleeding from large veins.	Died, 8th day. Uterus and ovaries healthy. The tumour, a fibro-plastic growth, originating in the serous membrane, and involving intestines, omentum, and liver.
5	Mr. Lowe, Lynn.....	March	44	Married	Peritoneal fluid evacuated by a small incision. Cystoid cavity formed by adhering coils of intestine and thickened peritoneum.	Recovered.
6	Hospital	June	43	Married	An incision made to complete diagnosis, and a fibroid tumour of the uterus was not disturbed.	Recovered from incision. Left hospital, 23rd day.
7	Hospital	Dec.	35	Single	Patient moribund with dyspnoea and anasarca. Incision made to ascertain nature of abdominal tumour. Fibro-plastic growth not disturbed.	Relieved by drainage of serum from cellular tissue. Died 2 months after. Tumour weighed 84 pounds.

It is very satisfactory to find that the mortality after ovariectomy is steadily diminishing. Of my first 100 cases, thirty-four died; of the second 100, twenty-eight; of the third 100, twenty-three; and of the fourth, twenty-two.

In this fourth series the advantage has been greatly among the private patients; the mortality with them having been only 14 per cent., while in hospital it was 31 per cent. The numbers were—

		Cases.		Recovered.		Died.		Mortality per cent.
Hospital	...	44	...	30	...	14	...	31·81
Private	...	56	...	48	...	8	...	14·28

If this greater mortality in hospital should be found to prevail in future, in spite of careful precautions to avoid all known preventable causes of mortality, it will become a serious question whether a more complete system of isolation ought to be obtained than is possible in an hospital even so small as the Samaritan. Of the last forty cases in this series there was not one death in private practice, while there were twenty-four cases all recoveries, the only deaths having been in hospital.

These facts may encourage the hope for still more favorable results as experience and knowledge increase. Ten years ago, an estimated mortality of even 22 per cent. would have been received as far too favorable. Yet it has been attained; and, after very full consideration, I venture to express the conviction that the mortality may be reduced to 15, or perhaps to 10 per cent., without excluding those extreme cases in which the operation is performed as a forlorn hope.

In former papers published in the 'Transactions' I have added to the tables, remarks "On the History and Progress of Ovariectomy in Great Britain," "On the Selection of Cases for the Operation," "On the Situation and Length of the Incision," and "On Tapping Ovarian Cysts." I now propose to offer a few remarks "On the Diagnosis of Uterine from Ovarian Tumours," a difficulty which frequently arises in practice, which may often be solved with great ease, which as often requires much cautious investigation, and which in some cases can only be cleared up by an exploratory incision.

In the following remarks I purposely exclude all reference to pregnancy, only intending to point out that large tumours of the non-gravid uterus may be mistaken for ovarian tumours, and attempting to explain how they may be distinguished from each other.

It is only since ovariectomy has become a familiar operation that the fact of uterine tumours frequently attaining a very large size has become generally known. Even now I am often told by men of great experience that a tumour must be ovarian because it is too large to be uterine. They have never seen nor heard of any such enlargement of the uterus, and are astonished when I say that the largest abdominal tumours I have ever seen have been fibroid or fibro-cystic tumours of the uterus.

In one of the earliest attempts to perform ovariectomy in Great Britain, in 1825, Mr. Lizars fell into this error of diagnosis. He opened the abdomen, and found a large uterine tumour. And the first tumour supposed to be ovarian which was removed in London—by Dr. Granville, in 1827—proved to be a fibroid tumour of the uterus, weighing eight pounds. Of the eight first published cases by Koeberle of removal of uterine tumours by gastrotomy, in only three was the diagnosis of uterine tumour made accurately before operation. In two the diagnosis was doubtful, and in three the tumour was believed to be ovarian. Indeed, more than a hundred cases are on record where the abdomen has been opened with the object of removing an ovarian tumour, but the operator discovered, after making the incision, that the tumour was not ovarian, but uterine. And further—some of the tumours actually removed, and believed by the operator to be ovarian, have been proved on careful examination to be really fibroid outgrowths from the uterus, more or less pediculated. In one case of a pediculated fibro-cellular outgrowth from the fundus uteri, I only discovered what I had done by finding both ovaries healthy, and when this tumour was exhibited at one of our societies I had difficulty in convincing some of the fellows that it was not ovarian.

In the first volume of my work on 'Diseases of the Ovaries,'

published in 1865, I have recorded cases where I removed large uterine tumours containing solid fibroid masses many pounds in weight, and cyst-like cavities containing more than 20 pints of fluid, these tumours being so far pediculated out-growths from the peritoneal surface of the uterus that the mobility of the cervix uteri was free, and no enlargement of the uterine cavity could be detected by the sound.

It is quite certain, therefore, that both uterine and ovarian tumours may lead to very great enlargement of the abdomen, and I can add from my own observation that the tumours may be central in position or inclined to one or other side; either round, ovoid, or irregular in form; smooth or lobulated on their surface; either hard, or elastic, or fluctuating; either tender or insensible to pressure; and either adhering to the abdominal wall or moving beneath it with or without crepitation.

It is also certain that there is nothing in the *history* of a doubtful case which affords any very decisive assistance in diagnosis; for although the increase of ovarian tumours is often rapid, it is almost as often slow; and if the increase of uterine tumours is generally slow, it is not infrequently rapid. Uterine hæmorrhage, either in the form of excessive menstruation or of floodings at irregular intervals, is certainly more common in uterine than in ovarian tumours, but is occasionally associated with the latter. Probably the rule is that menstruation is scanty when a tumour is ovarian, and excessive when it is uterine, but exceptions to this rule are numerous. And discharges of albuminoid fluids from the vagina at variable intervals are common in both classes of tumours.

So with the *age* of the patient. Perhaps uterine may be more common than ovarian tumours in old persons, and ovarian more common than uterine tumours in young persons; but it is certain that both uterine and ovarian tumours are common in single, married, and widowed women at all ages after puberty, and in all conditions of life.

They are also observed in some women who are extremely fat, in some who are otherwise healthy and well-nourished, and in some who are extremely emaciated; and

there is a facial expression common to women suffering from both classes of tumours, associated commonly with a very florid complexion when the tumour is uterine. In the majority of ovarian cases the complexion is pallid; but in some cases, where the patient is fat or well-nourished, the complexion may be florid.

Remembering the numerous exceptions to all the rules just stated, we may now inquire what may be learned by the eye, the touch, and the ear, in an examination of the abdomen; in other words, what are the signs afforded by inspection and measurement, by palpation, and by percussion and auscultation, which are of value in diagnosis. The results of this inquiry may be arranged in the following order.

Inspection.

1. Visible enlargement of the abdomen is more often *general* in cases of ovarian tumour, and *partial* in cases of uterine tumour, being confined to the lower part of the abdomen until a very large size has been attained.

2. The depression of the umbilicus is diminished, or the umbilicus may become prominent, in large ovarian cysts. This is rarely seen in uterine tumours unless fluid is also present in the peritoneal cavity.

3. Enlargement of the superficial veins of the abdominal wall, and oedema of the abdominal wall and of the *linæ albicantes*, are more general in uterine than in ovarian tumours of moderate size, but are not uncommon when ovarian tumours have attained a very large size.

4. When the abdominal wall is thin, both uterine and ovarian tumours, if not very closely adherent to the abdominal wall, may be seen to move downwards as a recumbent patient inspires, and upwards during expiration, falling downwards and forwards as she sits or stands, and more or less to either side according to the inclination of her body. But nearly all uterine tumours, though visibly moving above, seem to be fixed below in the hypogastric region.

5. When a recumbent patient attempts to sit up without

aid from any other than the abdominal muscles, the recti are seen to bulge forward in front of a tense non-adherent ovarian tumour or with a flaccid adherent cyst. This is seldom well marked in uterine tumours, a solid mass fixed centrally below the umbilicus interfering with the free action of the recti.

Measurement.

6. Increase in the circular measurement of the abdomen is usually greater on one side than the other in ovarian tumours. In uterine tumours the increase is more often symmetrical. In both classes, vertical measurement shows the distance between the pubes and the sternum to be increased. But very great proportionate increase of the space from the pubes to the umbilicus is more common in uterine than in ovarian tumours.

Palpation.

7. Large masses of apparently solid matter, and smaller masses or nodules of very hard or bone-like substance, are sometimes observed in ovarian tumours. But it is excessively rare to find such solid portions *preponderating* in an ovarian tumour. As a rule, the fluid or cystic portion is the larger, the hard or solid portion the smaller, in ovarian tumours. In uterine tumours, on the contrary, the solid is the larger, the fluid the smaller, portion.

8. The mobility of ovarian tumours is generally greater from below upwards than that of uterine tumours, unless the latter are distinctly pediculated. If one hand be pressed backwards between the tumour and the pubes, an ovarian tumour can generally be raised considerably, and the hand can sometimes be pressed backwards almost to the brim of the pelvis; while a tumour which involves the body and neck of the uterus cannot be raised at all, or only with difficulty, and the hand cannot be pressed down between the pubes and the tumour.

9. When there is fluid free in the peritoneal cavity, and a hard tumour can be felt on displacing this fluid by sudden

pressure, the tumour may be either uterine or ovarian. If the tumour be very hard and the quantity of fluid small, the tumour is probably uterine and the fluid ascitic. An ovarian tumour which has given way, and emptied one or more of its cysts into the peritoneal cavity, is seldom hard or well-defined in outline, and the quantity of fluid is often so large that the size and shape of the tumour cannot be ascertained until after removal of the fluid by tapping. The characters of the fluid will then complete the diagnosis.

Percussion.

10. As percussion elicits a dull sound all over both uterine and ovarian tumours, which dulness ceases abruptly at the border or outline of the tumour in all positions of the patient—except in the rare cases where a cyst contains gas, or where a coil of intestine is adherent in front of a tumour—percussion cannot afford much aid in distinguishing ovarian from uterine tumours.

Auscultation.

11. In ovarian tumours the impulse from the aorta is often perceptible, and a sound sometimes accompanies the impulse. The sounds of the heart are rarely transmitted, and any distinct vascular murmur is excessively rare. But in about half the cases of uterine tumours which I have examined some variety of vascular murmur may be heard. In some cases the murmur is tubular, in others vesicular, and sometimes a tubular and a vesicular murmur may be heard in different parts of a uterine tumour. These murmurs are synchronous with the pulse. They may vary in intensity with the amount of pressure by the stethoscope, and may disappear on very firm pressure. Common in uterine, very rare in ovarian tumours, vascular murmurs are valuable aids in diagnosis.

Having thoroughly examined the abdomen, the pelvis is

next to be examined by the vagina and rectum, and a conjoined examination of the tumour by the abdomen and pelvis should also be made.

Examination of the vagina may at once remove all doubt, by showing that the os and cervix uteri are in a healthy state, that the uterus is normally mobile, that its cavity is neither elongated nor shortened, and that any tumour felt through the vaginal wall is independent of the uterus. In such a case the tumour is almost certainly ovarian. On the contrary, we may find the vagina more or less completely obliterated by a solid mass, the cervix uteri gone, the os reached with difficulty, the cervical canal so closed or distorted that the sound cannot be passed, or the uterine cavity so enlarged that the sound may pass many inches beyond the normal length. Here the tumour is almost certainly uterine.

But it must be remembered that considerable peritoneal outgrowths, or large growths within the walls of the fundus or body of the uterus have been observed, while the uterine cavity has remained unaltered in dimensions and the cervix in structure. And, on the other hand, the cervix may be drawn up out of reach, or the whole uterus may be elongated, when the connection with an ovarian tumour is close; or the lower portion of an ovarian tumour may be so moulded to the true pelvis that the uterus is pressed upwards and forwards, or flattened behind the pubes, so that the tumour and the uterus are either really or apparently inseparable from one another. Abnormal arterial impulse in the vagina and cervix uteri may be felt in both classes of tumours. But I have never felt the vascular thrill like that of varicose aneurism, occasionally felt in the lower segment of a fibroid uterus, in any ovarian tumour.

The vaginal walls may be so depressed, when there is much fluid free in the peritoneal cavity surrounding either a uterine or an ovarian tumour, as to form a vaginal rectocele. And the uterus may either remain above the brim of the pelvis if greatly enlarged, or if fixed by adhesion; or it may prolapse with the vagina, the os appearing at the most depending part of the protrusion. Here the uterine sound will generally

remove all doubt; for if the dimensions of the uterine cavity are normal, and the weight of the uterus is not increased, the tumour can hardly be uterine. And a uterus which is not much enlarged can generally be pushed up to its normal situation.

In some cases where the uterus is much elevated, it may be felt through the abdominal wall above the pubes, while the os uteri cannot be reached by the vagina. The urethra may be elongated or drawn to one side, and the bladder may also be displaced. If the abdominal tumour and the pelvic portion of the tumour fluctuate, while the uterus does not much exceed its normal dimensions, it is almost certain that the uterus is adherent to, and is elevated by, an ovarian tumour.

Examination by the rectum may show that the uterus preserves its normal size, shape, and position. Or it may be displaced by some tumour above or in front of it, and one or both ovaries may sometimes be felt. This, however, is not very common if they are not enlarged nor lower in the pelvis than usual. By one finger in the rectum and another in the vagina, the consistence, form, and size of any intervening structure can be ascertained and valuable information so obtained. And if the sound be passed into the uterine cavity, and examination then made by the rectum, it is often easy to ascertain whether any solid or fluid tumour is situated between a normal uterus and the rectum, or whether the uterus is fixed and its posterior part enlarged.

When a tumour can be felt in the pelvis by vagina and rectum, as well as in the abdomen by the abdominal wall, simultaneous examination will be required to ascertain if there is more than one tumour, and if the uterus is independent or not. Pressing one finger firmly on the cervix uteri, and moving the abdominal tumour with the other hand from side to side, then upwards and downwards, the uterus may be felt to remain almost unaffected by the movements of the tumour, or only to receive some transmitted movement as the pelvic portion of the tumour moves. Here the strong probability is that the tumour is ovarian.

On the other hand, every movement of the abdominal tumour may be communicated immediately to the uterus, which is felt to move in all directions with the pelvic portion of the tumour. If this portion is solid, it is almost certain that the tumour is uterine.

Cases are sometimes met with where ovarian tumours and fibroid tumours of the uterus are both present at the same time. Small uterine fibroids are often observed when the only important tumour is ovarian. I have seen a large cyst of one ovary and a large uterine fibroid coexisting. I have twice seen tumours of both ovaries present when the uterus was enlarged by fibroids, and several cases where both uterus and ovaries were simultaneously affected by malignant disease.

If these possible complications be borne in mind, such an examination as I have suggested will in most cases suffice to establish an accurate diagnosis between uterine and ovarian tumours. In some cases doubt may still remain, and exploratory puncture or incision may then be necessary.

If I were to discuss the question whether puncture or incision should be preferred, and what information can be gained by them, I should be compelled to enter into a full account of the physical and chemical characters of the fluids found in ovarian and uterine tumours. I have prepared such an account with much care, and have had many engravings made to assist in the description; but this paper has already extended to such a length that I cannot ask for the further attention of the Society now, but hope I may be permitted to bring this part of the subject before the Fellows at some future meeting.

ON
DEXTRAL PRE-EMINENCE.

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THAT man has been from time immemorial a right-handed animal, I take to be a matter beyond dispute. The monuments of Assyria and of Egypt, the language of the Bible and other ancient records, as well as the accounts given by travellers in all ages and in all countries, testify to the fact. So strange a phenomenon could not but attract early attention, and there is, perhaps, no feature of our bodily structure for which more numerous explanations have been devised.

To give a list of these would be wearisome and useless, and I shall limit myself to mentioning one or two of the more notable ones, which may be taken as types of the rest. For numerous as the explanations are, they may all be divided into two classes; in the one of which the phenomenon is attributed to differences, quantitative or qualitative, in the blood of the two sides of the body; while in the other a cause is found in a conventional agreement made for convenience between the members of a community, and

handed down by educational influence from parent to child, through successive generations.

Of the former group Aristotle will supply an example. The right side, said he, is pre-eminent over the left, because it receives, not only a more abundant supply of blood, but blood of a different quality, purer and hotter. For the aorta with its branches supplies the left side, while the vena cava, which is larger than the aorta and lies on its right, supplies the right side of the body.¹ Sir Thomas Browne, on the other hand, dismisses this and all similar explanations alike, and declares that in his opinion the dextal pre-eminence has "no regular or certain root in nature;" that it does not exist in children, and that in adults it is the result of institution, not of nature; "for it is most reasonable for uniformity and sundry respective uses that men should apply themselves to the constant use of one; for there will otherwise arise anomalous disturbances in manual actions, not only in civil and artificial, but also in military affairs and in the several actions of warre."² At a later period we find Bichat professing much the same opinion. This anatomist had laid down the law that the instruments of the life of relation are symmetrical, while

¹ I take this opportunity of correcting an error which has somehow crept into the history of physiology and been universally accepted; namely, the statement that it was Galen who first discovered that the arteries during life contain blood, all his predecessors having thought that they contain air. Even Cuvier, the great admirer of Aristotle, attributes to him this erroneous belief. So, also, does Milne-Edwards, who goes so far as to consider why Galen, in his treatise on the contents of the arteries, attacked Erasistratus rather than Aristotle ('Leçons sur la Phys.,' i, 10—11). Yet Aristotle states on several occasions, and with the greatest distinctness, that the arteries as well as the veins contain blood, the blood in the former being of a different quality from that in the latter ('De Partibus Anim.,' iii, 4, 5). He also states that often after death some of the larger vessels *appear* to contain no blood, and accounts for this ('Hist. Anim.,' iii, 2). The mistake has arisen partly from mistranslation of the words *φαίψ* and *ἀρτηρία*; of which the former in Aristotle means *blood-vessel*, not *vein*; the latter *windpipe*, not *artery*; and partly from reliance being placed on the treatise 'De Spiritu,' which is most clearly not the work of Aristotle at all, standing not only in its doctrines, but in its language, in strong contrast with the genuine Aristotelian treatises.

² 'Vulgar Errors,' iv, 5.

those of organic life are unsymmetrical. The functional superiority of the right hand over the left seemed opposed to this doctrine. And so Bichat got over the difficulty by asserting that "this discord has no foundation, or next to none, in nature; but is manifestly the result of our social habits." The order of letters in writing, he says, is from left to right, and this circumstance compels us to use the right hand, which is much more adapted for motion in this direction than is the left. So also "*la nécessité de l'ensemble dans les combats a déterminé à employer généralement la main droite pour saisir les armes; l'harmonique qui dirige la danse des peuples les plus sauvages exige dans les jambes un accord, qu'ils conservent en faisant toujours porter sur la droite leurs mouvements principaux.*"¹ These arguments scarcely deserve serious consideration. Bichat seems to have forgotten that Eastern nations—the Jews, for instance—in writing move the hand from right to left, and yet are as much right-handed as ourselves. So also it is ludicrous to speak of the exigencies of neat military drill, or of æsthetic dislike to inharmonious dances, in the case of such races as the Andamanians, the Esquimaux, or the Fuegians. Yet all of these alike show dextral pre-eminence. Moreover, even allowing that convenience of any kind may have led the members of a savage community to select by consensus one side as that to be used preferentially in one-sided actions, we may still ask how came it that each savage race made the same choice? Why was the right side invariably selected by them all and in no single instance the left?

Bichat, indeed, seems himself to have felt the inadequacy of his explanation. For he allows that the selection may have been biassed in some very slight degree by certain peculiarities of our conformation. Digestion, he says, is attended by lassitude, which, owing to the position of the stomach, affects the left side more than the right, and leads us to give the former as much rest as possible. Of more importance is his statement that the right subclavian artery is slightly larger than the left one. If this be really so—

¹ 'La Vie et la Mort,' première partie. Art. prem., i.

and Bichat's anatomical repute is, I suppose, a sufficient guarantee for the correctness of his statement—we can scarcely doubt but that the larger size of the artery is in some way or other connected with the pre-eminence of the right hand. It does not, however, by any means follow that it is the cause of that pre-eminence. It is equally possible that it may be its consequence, for increased use of an organ leads to increased size of its arteries. And that this is indeed the case is rendered the more probable by the fact that no similar difference of size has been noted in the arteries which go to the right and left legs, and yet dextal pre-eminence is not confined to the anterior limbs, but extends to the posterior ones, as, indeed, Bichat himself seems to allow. The difference between the two legs is not so striking, nor so easily observed, as that of the two arms; as is perfectly intelligible when we consider that no action of our ordinary life calls one leg by itself into play. I have, however, convinced myself by observations on boys playing at football, and learning to skate, that the right leg is used preferentially to the left by those who are right-handed, and *vice versa* that the left leg is used preferentially by such as are left-handed. So also the right foot is, as a rule, somewhat larger than the left one. I am told by boot-makers that this is almost, though not quite, invariably the case, and such measurements as I have made confirm their statement. On the other hand, I found in two left-handed persons, whose feet I lately had the opportunity of measuring, that the usual proportions were inverted, the left foot being in both cases somewhat the larger, and in one of the two cases very considerably so.

Since the days of Bichat the question of right-handedness has ceased to attract much attention, and is scarcely, if at all, mentioned in our physiological text-books;¹ owing,

¹ Since the above was written a paper on "Left-handedness," by Dr. Pye Smith, has appeared in the 'Guy's Hosp. Reports.' After carefully reading that article I have not changed the opinions expressed in this communication; I have, therefore, thought it best to leave my paper unaltered, and refer my readers to Dr. Pye Smith's pages for the different views which he holds.

apparently, to its being pretty generally admitted that the explanation of the matter is not to be sought in our bodily conformation, but in the effects of conventional education. This opinion I wish to combat, and I will now state in order the many objections which appear to me to render it untenable.

The first objection which I would urge is the one already mentioned. We can understand how possibly the individual members of a community might be led by convenience to agree to use one or the other hand and foot as the preferential organ, but there is no apparent reason why separate communities should all have come to the same conclusion, and should all have fixed on the right for the favoured side; and not some on the right, others on the left, as the law of chances would require.

Secondly, I would point out that the hypothesis which attributes dextral pre-eminence to mere education does not account for the numerous exceptions to the general law which notoriously occur. There are a vast number of individuals brought up under precisely the same conditions, as regards this matter, with their fellows, who yet are what is called left-handed, and who remain so in spite frequently of their eager wish to change their manner and accommodate themselves to the fashions of their companions. Such exceptions are much more numerous than is, I imagine, supposed. At any rate they are much more numerous than I myself imagined to be the case before I had taken the trouble of inquiring personally into the matter. Unable to find any reliable statistics, I went through the tedious task of asking 2000 consecutive hospital patients—1000 men and 1000 women—whether they were right- or left-handed. Of the 2000, no less than 85 were left-handed. There was a remarkable difference, as will be pointed out later on, between the 1000 men and the 1000 women; but at present I am only concerned with the general result, and that was that no less than $4\frac{1}{4}$ per cent. of this large number of persons were left-handed. If the education hypothesis were correct we shall expect to find that these 85 exceptionally

left-handed persons were the children of left-handed parents, who had trained their offspring in their own peculiarity. But this was not the case. Of the whole 85 no more than 12 had a left-handed parent. I need hardly say that, as the statistics were obtained from hospital patients, the influence of nurses other than the parents may at once be dismissed as unimportant.

Any one, moreover, who takes the pains to inquire into the details of a few left-handed cases will soon find instances in which all idea of direct parental or educational influence will have to be abandoned. He will find cases in which a single member of a large family is left-handed, while the parents and all the rest of the children are right-handed. Thus (to give one instance out of many), I am acquainted with a gentleman, the fifth of a family of nine. He was brought up under the same conditions as his brothers and sisters. All these, as also his father and mother and his nurse, were right-handed. But he, in spite of all efforts to make him conform to the usual habit of the world, is so far left-handed still in adult life as to shoot from his left shoulder, hold the billiard cue in his left hand, and generally, with the exception of writing and holding his knife at dinner, to perform all acts requiring only one hand with the left.

A third argument is this. Left-handedness, though, as the remarks just made show, it cannot be attributed to the *direct* teaching of parents, is yet an hereditary affection; and the same phenomena are observable in its distribution in a family as are observable in the case of indisputably physical peculiarities, such as polydactylism and the like. Like them, it appears here and there in individual members of the family, so to speak, capriciously, that is without our being able to assign a definite cause for its presence or absence in the separate cases. Of this I have seen many instances, but I will only give one of the more striking ones.

C. S— is left-handed in a marked degree. She holds her knife at dinner, scrubs, washes, lifts heavy weights, with her left hand, invariably using, however, her right for the needle and for writing. Neither of her parents are left-handed; but

her grandfather was. She has a sister who is left-handed ; and this sister has a left-handed son and several other right-handed children. She has also four brothers, all right-handed ; but one of these has a left-handed son, another a left-handed daughter.

I could multiply such examples. But any one who inquires into this matter will find they are of common occurrence. I will therefore content myself with giving the general result of my inquiries as to the hereditary nature of this affection.

Of fifty-seven left-handed persons of whom I made inquiries as to their relatives, no less than twenty-seven knew of one or more left-handed relatives within the degree of first cousin. Most of these fifty-seven persons were hospital patients, and these were rarely informed as to the whole number of their uncles, aunts, and cousins. Had they been able to give full information, doubtless the proportion of family cases would have been found to be larger. But even as it is, it would appear that in practically one half of the left-handed cases the affection was sporadic in the family.¹

Left-handedness, then, resembles abnormalities of bodily structure in its "running in families." It resembles them also in another curious way, namely, in the different frequency with which it attaches to the two sexes. Of the 1000 men of whom I made inquiries, 57 were left-handed ; of the 1000 women, only 28. In other words, this peculiarity is twice as common in men as in women.² Now, a precisely similar phenomenon is observable in the case of undoubted malformations. Most, though not all, of them are much more frequent in males than in females. Thus congenital talipes, according to Mr. Brodhurst, occurs

¹ In further confirmation of the hereditary nature of this affection, I may point out that all the left-handed persons mentioned in the Bible belonged to one single tribe, namely, the tribe of Benjamin. If we suppose that the patriarch Benjamin—"the son of my right hand"—was left-handed, the frequent occurrence of the like affection in his closely intermarrying descendants is only in accordance with what is noticed in other physical and therefore hereditary peculiarities.

² This accords with the somewhat exaggerated aphorism of Hippocrates—*γυνή δυδῖμα ἀμφιδέξιος*.

in three boys to one girl;¹ extroversion of the bladder, according to Geoffroy St. Hilaire, in eight boys to three girls.² Dr. Burt Wilder found polydactylism to be twice as frequent in men as in women.³ Similarly, Mr. J. Wood, in speaking of the variations of the muscles in the human body, states that "the greatest number of abnormalities in each subject is found in the males;"⁴ and Professor Macalister remarks to the same effect.⁵ Inversion of the viscera, also, according to G. St. Hilaire, is more common in the male than in the female.

A fourth argument will come home to those who have had to do with left-handed children. The peculiarity manifests itself before education begins, and persists often with obstinacy in spite of all the efforts of the parent to overcome it. Every one who has paid attention to this subject must have seen or heard of cases in which this occurs. Not rarely even the child's left hand is confined so as to force it to use the right one. If the left-handed tendency be but slight, such

¹ 'Deformities of the human body,' p. 71. Mr. Brodhurst tells me that his statement was founded on a basis of 600 cases. Before I knew that he had examined into this point, I took the trouble of collecting cases from the records of St. George's, the Orthopædic, and the Children's Hospitals, and found that this deformity is much more frequent in males, though my figures do not give so great a difference as Mr. Brodhurst's. Of 565 cases which I gathered together, 326 were males, 239 females.

Of 149 cases of cleft palate which I collected, 82 were males, 67 females. But these figures are too small for any sure conclusion; and Mr. T. Smith, who has large experience in such cases, assures me that cleft palate is equally common in both sexes.

² 'Histoire d. Anomalies, &c.,' i, 386. The greater tendency of the male to vary than the female is the more curious, seeing that actual monstrosities are much more frequently female than male. Double monstrosities are, according to G. St. Hilaire, female in three cases out of four. Haller also says that there are many more female than male monstrosities. So also says Meckel ('Anat. Gén.,' i, 86; 'Anat. Comp.,' i, 422 and 551; and 'Comm. de dupli. Monstros.,' p. 14). "Lex est generalis, paucis tantum exceptionibus subjecta, monstra femina longe sæpius occurrere masculina."

³ 'Massachusetts's Med. Soc.,' ii, No. 3, 1868, p. 9. Quoted by Mr. Darwin, 'Descent of Man,' i, 276.

⁴ 'Proc. Royal Soc.,' xvi, July, 1868, pp. 519, 524. Also quoted by Mr. Darwin.

⁵ 'Proc. Royal Irish Acad.,' x, 1868, p. 123. Also quoted by Mr. Darwin.

measures often result in the child growing up to all appearances a right-handed being; but if, as also not rarely happens, the tendency be strong, the child will still in adult life retain some trace of its pre-educational preferences, and will use the left hand for purposes which have not been brought under control, such as throwing a stone and ball, or the like.

The fifth and last argument which I shall advance against the education hypothesis is this. Man is not the only right-handed animal, a similar peculiarity occurring in cases where education is completely out of the question. Thus, the observations which I have made on monkeys have convinced me that they, like men, are, as a general rule, right-handed. I have hunted in vain for any information on this point in works on natural history, and it may therefore be worth while to describe my observations. If, standing close to a monkey, one offers it a nut or apple, the monkey takes it with the nearest, and so the most convenient, hand, be this the right or the left, and will proceed to use both or either indifferently in conveying it to its mouth. But if, instead of standing close to the monkey's cage, one stands, bait in hand, at some distance—at such a distance that is, that right and left hand are equally distant from the tempting morsel—the monkey will stretch out one of its arms as far as possible through the bars of the cage; and in the great majority of cases the arm thus extended will be the right one. Some few monkeys, it is true, will stretch out the left limb; but this is comparatively exceptional, and, as I have said, in most cases it is the right arm which will be used preferentially. Moreover—and this is the most important point to notice—on repetition of the experiment it will be found that each monkey will act in precisely the same manner as it did on the first trial; that is, those which on the first trial extended the right will do the same on the second occasion, and similarly those that extended the left will again use the same arm. Now and then, doubtless, an exception will occur, just as a right-handed man may occasionally extend his left arm instead of his right to grasp an object. But the rule is

as I have stated it. It requires some patience and some conscientiousness to make the experiments properly, but any one who will take the trouble to do so will, I feel assured, come to the same conclusion as that at which I have arrived. The year before last I spent much time in investigating this matter at the Zoological Gardens, and found that of twenty-three monkeys, twenty were right-handed, three only were left-handed. I learnt to distinguish the several individuals I observed from each other, and found that I could tell any companion who might be with me, with almost perfect certainty, whether a given monkey of the lot would protrude right or left, when tried in the way I have described. Now, it will hardly be asserted that a monkey is disciplined by its parents to use one hand in preference to the other; and the only conclusion one can draw is that the similar dextal pre-eminence of man and monkey depends on some common fact in their anatomical structure.¹

There is another animal that, owing to the manner in which it uses its limbs, lends itself easily to experiment, namely, the parrot, and the large collection of these birds in the Zoological

¹ I have tried without much result to find out whether any similar difference between the two sides exists in the case of other mammalia. The restriction of their anterior limbs to progression leaves no other available method of examination than comparison of weights, and I have found it impossible to procure thoroughly reliable weight results from butchers and others. I am, however, informed by my butcher that he has weighed the two sides of oxen and of sheep as I requested, and that the right fore-quarter of an ox is, as a rule, some three or four pounds heavier than the left; the right fore-quarter of a sheep one pound or so heavier than the left. Other butchers, however, have told me that they find no such differences. As regards horses, Mr. Bicknell informs me that in two cart-horses killed for the horseflesh dinner at the Langham Hotel, the right fore-quarter in each case weighed exactly nine pounds more than the left. It will be noticed that these were cart-horses, not horses artificially trained to certain paces. These data are, however, too few to form the basis of any serious argument; and even should it turn out on further examination that in reality the right side of horses and of ruminants is somewhat heavier than the left, interesting in itself as the fact would be, it would still be open to question whether this difference in weight corresponded to a difference in functional activity. I have, therefore, determined to leave these animals aside for the present.

Gardens affords an ample field for observation. If a parrot be made to climb up the wires of its cage and a nut be then put into its beak, the bird climbs back to its perch, and then, supporting itself on one leg, proceeds to manage its nut with the other. In the majority of cases the leg which is used preferentially as a support is the right one. There are doubtless exceptions in which the contrary is the case, but, as a general rule, it is the right which is selected. Moreover, on repetition of the experiment it will be found, as with monkeys and with men, that each individual parrot always acts in precisely the same way. Those which on the first trial support themselves on the right will invariably be found on a fresh trial to do the same, and the like uniform behaviour will be noticed in those that use the left. Of eighty-six parrots that I tested repeatedly in this way, sixty-three invariably supported themselves on the right leg, while the remaining twenty-three as invariably perched on the left one.¹

I have, I should remark, seen it gravely stated that all birds necessarily support themselves on the right leg because the position of the liver throws the centre of gravity into the right half of the body. I cannot but think that in asserting this it has been forgotten that the difference in weight of the two sides in a bird thus produced is excessively small, and is, in fact, fully compensated, if not over compensated, by the stomach and, in females, the ovary being both on the opposite or left side of the body. Moreover, the fact, for which this inadequate explanation has been devised, is itself

¹ It may, perhaps, be objected that, as the parrot, though it perches on the right foot, uses the left to feed itself, it may as fairly be said to manifest a sinistral as a dextral pre-eminence. So far as my argument goes at present this is a matter of indifference. All that I have to insist upon is that the two sides are used differently. But, as a matter of fact, the pre-eminence must be considered dextral, not sinistral, for in the double act that part is fundamental which precedes the other. The parrot must rest itself upon the right leg *before* it proceeds to use the disengaged left; and so, also, the young parrot must first learn to support itself on the right before it can learn the after act of feeding itself with the free foot. In other words, the original selection is of the foot which shall serve as a support, not of the foot which shall be used for feeding, and this selection is in favour of the right as a rule.

imaginary. Repeated observations of birds of various orders, other than the parrots, have led me to believe that not only is the left leg used as much as the right for perching, but that the very same individual uses sometimes one, sometimes the other, indifferently. Parrots are, in fact, the only birds in which I have been able to detect with actual certainty any pre-eminence in one side above the other.

The arguments I have now advanced are, I think, conclusive that the generally held opinion which attributes dextral pre-eminence to educational influence is erroneous. Still, I am far from supposing that the natural tendency may not be modified by education. I have already stated that I know of cases where a child that betrayed slight but indubitable tendencies to use the left hand preferentially has been brought by training to change altogether its habit, and has grown into an apparently normal right-handed man. When, however, the left-handed tendency is more strongly pronounced, the effect of education extends only to such actions as are directly subjected to control by the parent. What the child is taught to do constantly with the right hand it learns to do with that member, but such actions as are abandoned to its own will continue to be executed with the left. Rarely, for instance, if ever, does a child learn of itself to write. This is always a matter of teaching; and thus, however strongly left-handed an adult may be, he is always found to use the right hand for this office. Out of more than 100 left-handed persons whom I have observed, only four professed that they could write with the left hand. One of these was paralysed on the left side, so that I could not compare the writing of the two hands, but he wrote well and currently with the right hand. In two of the remaining three the handwriting executed with the left was clumsy, and done slowly and with difficulty, while that executed with the right was easy and in every way superior. The fourth case was the only one in which the left hand seemed equally good with the right. But this was the case of a child, as yet only half taught, and whose writing was unformed and rudimentary.

So also with the manual operations of skilled mechanics.

These are, like writing, matters of education and discipline, and are rarely found to be performed even by left-handed men excepting with the right hand. Untaught operations, on the other hand, such as the unskilled labour of mechanics, the lifting and carrying of weights, the wringing of linen, the manual part of games, such as ball-throwing and the like, continue, as a rule, to be performed by such men, even in adult life, with the left. Even these untaught actions, however, are sometimes gradually modified by the efforts of the child to imitate its playfellows and avoid their ridicule. This feeling of shame, so to speak, is of course much stronger in the well-nurtured than in the uneducated; and thus it is that I would account for the fact that left-handedness is apparently much less common in the upper and middle classes than in the lower. One can hardly look at a village cricket-match without seeing one or more left-handed players, while among gentlemen such is quite exceptional.

The very different degrees in which a left-handed tendency manifests itself in young children seems to me to be best explained by supposing that the great majority of men have a natural bias to use the right side in preference to the left; secondly, that there is a small minority who have an equally decided tendency to use the left; while, thirdly, there is another class without any natural bias at all. These latter are easily taught to follow the ordinary fashion, and in adult life will not be distinguishable from purely right-handed men. In a certain sense these may be called ambidextrous, though they may also equally well be called ambisinistrous. For their ambidexterity does not consist, as is usually implied by the term, in their having two skilful hands, each equivalent in value to a right one, but in their having two hands neither of which possesses the normal superiority of the right, and neither the normal inferiority of the left.

Right-handedness, then, though to a certain extent it may be strengthened or modified by education, has some or other basis in our bodily conformation. The next question to be considered is what this basis may be.

It is now a fact established beyond all dispute, in spite of the

opposition with which it has met, that the views originally propounded by M. Dax are correct, and that the mental faculties concerned in speech are, in the great majority of men, lodged in the left cerebral hemisphere. It is, however, unquestionable that now and then an exception to this rule occurs. In a paper published in 1867¹ I suggested that it might possibly be that these exceptions were cases of left-handed persons in whom the cerebral hemispheres were, so to speak, transposed. If this were so, it will, I think, be admitted that we should have clear proof that the normal pre-eminence of the right side of the body is due to a normal pre-eminence of the left hemisphere, and the exceptional pre-eminence of the left side to an exceptional pre-eminence of the right hemisphere. Since that paper was written I have seen near upon a hundred cases of paralysis with more or less impairment of speech, and I have taken pains in each case to ascertain whether the patient was right- or left-handed. In all but three instances the patient was right-handed, and in all this large majority the palsy was on the right side. In the three exceptions the palsy was on the left, and each of these three persons was left-handed. A case has also been published by Dr. Jackson of aphasia with left hemiplegia, which was at first supposed to be an exception to Dax's law. But in this case also it turned out, on Dr. Jackson making farther inquiries, that the patient was left-handed.²

There can then, I think, remain no fair doubt but that right-handedness depends on some predominance of the left brain, and left-handedness, when it occurs, on a transposition of this structural peculiarity, whatever it may be.

It may, perhaps, be urged that there are recorded cases in which the aphasia coincided with left hemiplegia, and yet the patient was not reported to be left-handed. But in answer to this I would say that none such have been recorded since special attention was directed to the probability of right- or left-handedness being concerned in the matter, and that without special inquiry it is very easy, as Dr. Jackson's case

¹ 'St. George's Hosp. Reports,' vol. ii, p. 122, 1867.

² 'Lancet,' 1868.

shows, for the coexistence of left-handedness to escape notice. Even should such a case occur it would not be necessarily incompatible with the views now expressed. For, as I have already stated, there are probably persons with a natural left-handed tendency, in whom the bias is so feeble that its external manifestations become completely masked by education. In such a person aphasia might occur with left hemiplegia, and such a case would then appear erroneously to stand in contradiction with Dax's law.

Opposed as this view of a structural and functional distinction between the two hemispheres is to our previous notions, it is not without strong support from other facts. Thus, Mr. Callender has shown, in an interesting paper recently read before this Society, that, while convulsions are a common accompaniment of disease of the right hemisphere, occurring in 39 out of 61 cases, they are but rarely produced by disease of the left hemisphere, having been present in only 7 cases out of 48. Dr. Boyd, again, found, by examination of nearly 200 brains, that "almost invariably the weight of the left hemisphere exceeded that of the right by at least an eighth of an ounce."¹ Lastly, Dr. Brown-Séquard, in a paper which I have not yet had an opportunity of reading, has stated his belief that the right side of the brain is more especially concerned with the organic functions, while the left more directly governs those of animal life.²

Having now traced back dextral pre-eminence to some or other difference between the left and right sides of the brain, we have next to inquire in what this difference consists.

In the paper to which I have already referred I pointed

¹ 'Phil. Trans.,' 1861, p. 261.

² To the differences above enumerated must be added that noted by Dr. Bastian; who found ('Journal of Mental Science,' xi, 492) that the average specific gravity of the gray matter of the left hemisphere is higher than that of the right.

"Budge, Valentin, et Schiff affirment qu'on peut exciter les contractions de l'intestin et de l'estomac à l'aide de stimulation directe des couches optiques, et Budge prétend que ces effets se produisent surtout quand on agit sur la couche optique droite."—Longet, iii, 415.

out that the convolutions on the two sides were far from symmetrical, and that though this asymmetry was apparent in some inferior animals, it was most conspicuous in man, and I suggested that this anatomical difference, in all probability, corresponded to some difference of function, qualitative or quantitative. At that time I knew of no law discernible in this asymmetry. I have since learned from Dr. Broadbent,¹ and have verified the fact by numerous examinations, that, as a general rule, with very few exceptions, the frontal convolutions are much more complicated upon the left side than upon the right. It is hardly necessary to point out that greater complexity of convolution means greater development of gray matter, and is an unmistakable token of superiority. The left hemisphere, then, is not only heavier than its fellow, but more highly developed, and it is in this structural peculiarity that I find the explanation of dextral pre-eminence.

It is, however, manifest that if this be so the structural peculiarities ought to be reversed in the brains of left-handed persons. After long waiting I succeeded in obtaining the brains of two left-handed women; and anxious that they should be examined, not only by a most competent authority, but by one who was free from any preconceived ideas which might prejudice his judgment, I got Dr. Broadbent to be good enough to investigate them. He has kindly favoured me with a most minute and careful account of each separate fissure and convolution, and with drawings which are exhibited, as also the brains themselves, to the Society. For my present purpose it will suffice to say that, as I had anticipated, the ordinary conditions of the two hemispheres

¹ From the following passage in an article on "Aphasia," by Dr. Bateman ('Journal of Mental Science,' October, 1869), I learn that M. Broca has also noticed the same fact as Dr. Broadbent. "M. Broca, who never takes anything for granted, and whose indefatigable zeal led him to examine forty brains, came to the conclusion that the convolutions are notably more numerous (P) in the left frontal lobe than in the right, and that the converse condition exists in the occipital lobes where the right is richer in convolutions than the left."

were in each of these brains reversed, the greater complexity of convolution occurring in both on the right side and not on the left.

In one of the two brains the difference of the two sides was very conspicuous, and the greater complexity included all the convolutions on the right outer surface alike. In the other the greater complexity of the right hemisphere was apparently limited to the frontal and parietal convolutions, the occipital lobe being more complicated on the left. This is, indeed, a more perfect inversion of the two sides than in the other case, for, in the ordinary normal brain, while the frontal convolutions are more complex upon the left, the occipital convolutions are, on the contrary, more complex upon the right.

There remains, then, no possible doubt but that right-handedness and left-handedness are associated respectively, the one with a more highly developed left hemisphere, the other with a more highly developed right one.¹ It may, however, be objected that this association admits of another interpretation than that which I have put upon it. That the greater development of the left brain may be the consequence of the increased use of the right side, and not its cause. A perfectly conclusive answer to this can only be obtained by an examination of numerous foetal or infantile brains, and of this I have had no opportunity. I would, however, urge in answer the observation of Gratiolet, disputed though its correctness has since been, namely, that the convolutions of the left frontal lobe appear earlier in the foetus than the corresponding convolutions of the right. Seeing, however, that we know, if the arguments I have used in the earlier part of this paper be valid, that some or other anatomical difference between the two sides *must* precede the right-handedness, and, moreover, that this difference *must* be somewhere in the brain (for how otherwise can the facts I have brought forward concerning aphasia be explained?) it appears to me only rational to suppose, when one finds such

¹ Or, more accurately, with more highly developed frontal convolutions, in the one case on the left, in the other on the right.

an anatomical difference between the two hemispheres as that now revealed, that this anatomical difference is the antecedent for which one was searching. The objection appears, then, to me to be at least hypercritical. Still, it will be well for those who may have the opportunity still further to examine into the correctness or error of Gratiolet's disputed statement.

So far, then, we have advanced with what I venture to think are pretty sure steps. There still remains, however, a further question on which I would express myself with some hesitation. To what are we to attribute this greater and, if Gratiolet be right, this earlier development of the left hemisphere? In the paper to which I have already twice referred, I expressed an opinion that the cause was to be found in the difference of the blood supply to the two sides of the brain; and to that opinion, though with some reserve, I am still disposed to adhere. In the first place, I find that the arteries which convey blood to the brain are, as a rule, somewhat larger on the left side than on the right, and that this rule apparently breaks down in the case of left-handed men. In twelve out of seventeen cases of right-handed men, in whom I examined the cervical vessels, either the common or the internal carotid was larger on the left side than on the right.¹ In the remaining five cases no difference could be detected. It is so rarely that one is able to get a post-mortem examination of a person known during life to have been left-handed, that I can give only very insufficient facts as to the conditions of the vessels in such cases. In three such instances, however, I have had the opportunity of examining the cervical arteries. In none of these three was the left carotid larger than the right, as in the great majority of right-handed men. In two of the three there was no apparent difference, while in the third

¹ The difference of size between the right and left carotids is very small. But a very small difference in calibre means a very considerable difference in result. For Poisseuille found that the amount of fluid discharged by small tubes increases, *ceteris paribus*, in proportion to the diameters of these tubes raised to the fourth power.

case not only were the right common and internal carotids nearly twice the size of the corresponding vessels on the left, but a similar disproportion, also in favour of the right, existed between the middle cerebral vessels. This is the only case, either of right- or left-handed subjects, in which I have found any difference of size between the two middle cerebral arteries.

It would appear then that, as a rule, in right-handed men the left carotid artery is larger than its fellow; and such scanty facts as can be given favours the idea that in left-handed men this condition is reversed. But here the objection, so often already alluded to, may be advanced with great force—that the increased size of the artery is the consequence of the increased use of the hemisphere to which it goes, and not its antecedent. While I fully admit the possibility and even the probability of this, I would urge one small fact which tells in the contrary sense, and seems to point to there being some tendency in the left arteries which go to the head to be larger than the right ones, quite independently of any difference in the functional activity of the parts which they supply. That small fact is this. The two vertebral arteries, which unite to form the basilar before they reach the brain, and which must, therefore, be precisely alike so far as the *vis a fronte* goes, yet often differ in size. And when this is the case the left is found to be the larger one more than three times as often as the right. In twenty-six cases Dr. Davy found the left the larger, while in only eight cases was the advantage on the side of the right.¹

Still, it must be admitted that the somewhat larger size of the left carotid is of dubious interpretation. There is, however, another advantage enjoyed by the left half of the brain which is not open to the same doubt. The amount of blood received by the two hemispheres respectively will depend, not merely on the relative size of the carotids, but also, *cæteris paribus*, on the relative tortuosity of these vessels. Every curve or angle in an artery, and every division in its course, is an obstacle to the flow of blood

¹ Cf. 'Edin. Med. Journ.,' li, p. 70.

through it, and will retard the current; and the sharper the angle is the greater will be its retarding effect. Thus, if two tubes of equal lengths and diameters, but one bent, the other straight, be run through the side of a barrel of water, it will be found that more fluid will be discharged in an equal time by the straight tube than by the bent one. Now, as the right carotid is given off from the innominate, while the left carotid is given off directly from the aorta itself, it is plain that the blood which reaches the former has one extra angle in its way. Moreover, it will be seen, on examining the larger vessels *in situ*, that while the left carotid, as a rule, is given off from the arch at such a point and in such a direction that its axis lies in the same line as the blood-current of the arch, so that the blood will pass into it directly without making any angle at all, the innominate is given off at a very considerable angle to the blood-current, so that the blood which reaches the right carotid has in reality to get round two retarding angles, first into the innominate, and then from this into the carotid; while the blood which passes into the left carotid has neither of these hindrances. The left side of the head will thus, as a rule, receive a more abundant flow of blood than will the right; and to this it is that I would attribute the greater development of the left hemisphere. I need hardly say that even within the limits of what is called the normal condition of the arch and its branches there are numerous small differences, and that the exact angles and positions at which the several branches are given off differ somewhat in different cases. With these variations will vary the degree of advantage enjoyed by the left side, and thus it is that we can account for the different intensity of the right-handed bias in different individuals. We can also readily understand how the angles of division may not unfrequently be such as to give no advantage whatsoever, in which case the person will be without any natural one-sided bias, though in all probability he will by education assume a right-handed habit. Neither is it difficult to understand how occasionally, be it by alteration of the angles and positions of the large

vessels or by counteracting differences in their later subdivisions, the advantage may even be on the side of the right, in which case the person will have a natural left-handed bias, even though the arterial branching be not what would ordinarily be considered abnormal.

It will naturally be objected that, if this explanation were true, we ought to find left-handedness the rule in such persons as have their viscera transposed. It must, however, be remembered that we must not expect to find all such persons left-handed. For the inverted arch will be subject to variations in the angles and positions of its branches, just as is the normal arch, and these variations will have analogous effects. So also we must remember that the apparent exceptions will be much more numerous in the persons with inverted arch than in the persons with normal arch. That is to say, very many more of the former must be expected to be right-handed than are found to be left-handed among the latter. For in both classes alike those individuals whose two hemispheres receive equal amounts of blood will, from the action of education on their naturally indifferent condition, become by habit right-handed, and such will be apparent exceptions in the class with inverted arch, but not so in the class whose arch is normal. All, in fact, that we can properly expect to find is, that a larger proportion of persons with inverted viscera is left-handed than of the world at large. Now, is this really the fact? I believe that it is. But the data are so few and vague that it is impossible to give a certain answer, and it is the want of better evidence on this point that makes me hesitate as to the validity of the explanation I am offering. There are but few cases of transposed viscera recorded, and in still fewer is it also recorded whether the subject was right-handed or not. Out of the very small number, however, in which this point has been attended to, a much larger proportion seems to have been left-handed than accords with the general average, which, as we have seen, is about $4\frac{1}{2}$ per cent.¹

¹ The fact that left-handedness is much less common in women than in men, and the observation of G. St. Hilaire that inversion of viscera is also more common in males than in females, taken together, are in complete harmony with the views expressed in the text.

So many cases, indeed, of inverted viscera with left-handedness have apparently been noticed, that Professor Hyrtl and others have thought that a constant coincidence existed between the two conditions. This, however, is certainly not the case; nor, indeed, should it be expected to be the case if the hypothesis I am advocating be true. As to those cases in which the viscera were transposed, and yet the persons were apparently right-handed, it must also be borne in mind that slight degrees of left-handed bias, as I have already noticed, frequently give way to the force of education, and this may very probably have happened in some of these.

Lastly, it may be asked, will the explanation here given embrace the cases of monkeys and of parrots, animals which, as we have seen, also manifest dextral pre-eminence, and does their left brain enjoy any vascular advantages over the right? It will, I think, be admitted that, if this could be shown to be the case, it would afford a very strong argument in favour of my explanation. As regards monkeys, I can but say that their hemispheres are known to be highly unsymmetrical, and that their arterial branchings appear to accord generally with those of man. But in parrots I find a striking corroboration of my hypothesis. In these birds there is a very great variability in the arrangement of the right and left carotid arteries. In some few the two are of equal size. But this is the exception. In the great majority the arteries are unequal, and when this is the case it is invariably the left carotid which is the larger of the two, as Meckel¹ years ago pointed out. Sometimes, indeed, it would appear that the right carotid is rudimentary, or even entirely absent, and that the brain receives its whole blood supply from the vessel on the left. It is difficult to suppose that this is a mere coincidence; but if it be anything more, it renders the explanation I have advanced in the highest degree probable.

In conclusion I must thank the Society for listening to a lengthy paper on what may seem to many a small and un-

¹ 'Anat. Comparée,' ix, 366.

important question. The problem, however, is one which has occupied men at intervals for more than 2000 years, and would on this ground, if on no other, merit some attention. But besides this, it is not without more important bearings. The question whether the two sides of the brain are to be looked on as simple repetitions of each other, as most of us have been taught, or whether they are not in many points functionally dissimilar, as many are beginning to suspect, is one in which physiologists and pathologists alike are deeply concerned, and the close connection of the point we have been discussing with this important question is sufficiently apparent.

ON
THE MODIFICATIONS PRODUCED IN THE
TEMPERATURE OF THE BODY
BY THE
LOCAL APPLICATION OF COLD AND HEAT.

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THE inflammation of internal organs is ascribed with great frequency, both popularly and by the physician, to the effect of cold acting externally, and especially to its *local* influence in the form of draughts and chills, such as are caused by currents of cold air, wet feet, &c., when the body is over-heated or is felt to be so. At the same time it is well known that the heat of the body remains nearly constant, notwithstanding great variations of the surrounding temperature.

With these facts in view, it becomes a matter of some interest to determine whether, under any circumstances, local applications of cold modify the temperature of the body generally, or of any part of it other than that on which they immediately act; or, in other words, whether any disturbance of the conditions regulating the natural heat of the body can

be induced in a moderate time by these means. The observations related below deal with some of these circumstances, and though a part of the ground has been gone over before by Edwards¹ and by Tholozan and Brown-Séguard,² my results differ so much from theirs that it seemed better to examine the matter afresh. In doing this three questions presented themselves for solution, to which direct experiment only could supply an answer, viz. what effect is produced on the temperature of any part of the body when one of the extremities is placed—1, in cold water; or, 2, in hot water; or, 3, when immersion in hot is immediately followed by immersion in cold water?

The extremities only are referred to, since they are well adapted for observations of this kind, and their temperature can be determined with great accuracy. From its convenience, water was used as the source of heat and cold.

The observations were thus conducted.

The subject of experiment was placed in a room free from draughts and of such temperature that no feelings of cold or heat were experienced, since these, as it will appear later on, seem to have a marked influence on the result. For similar reasons the cold and hot water were brought to him. A thermometer easily readable to 0.1 F. was placed in one or other hand (or foot) and the fist supported for a time by an elastic band stretched around it. When the mercury became stationary, which usually happened in 20—30 minutes, the other hand or foot was put into cold or hot water and maintained there for 15—40 minutes, and the temperature of the unimmersed hand noted at short intervals.

Brown-Séguard³ directs that observations of two minutes each should be taken of the unimmersed hand, the one before and the other after immersion of the opposite hand, in order that as far as possible the temperature of the *exposed* palm

¹ "Animal Heat," in 'Todd's Cyclopædia of Anatomy and Physiology,' vol. ii, p. 660, 1839.

² 'Journal de la Physiologie,' t. i, p. 500 *et seq.*, 1858. 'Experimental Researches applied to Physiology and Pathology,' p. 82, 1853.

³ 'Journal de la Physiologie,' t. i, p. 504.

may be ascertained; but this method seemed objectionable, inasmuch as it rendered it impossible to determine if a *rise* of temperature took place from an application to the opposite hand, as such would necessarily be the course of the mercury for several minutes more.

The heat of the body generally was examined by means of a thermometer placed under the tongue.

The experiments are arranged in a tabular form at the end of the paper, and reference will be made to them by numbers.

To proceed with the questions raised.

1. It was found in different individuals, male and female, that when one hand or foot was put into water ranging in temperature from 50° to 25° F., and maintained there for 4—40 minutes, no change occurred in the temperature of the body generally or of the other extremities. And further, that if the temperature of the unimmersed hand had not attained its maximum, it still continued to rise notwithstanding the cold applied to the other. (Exps. I, II, III and VI—XI.)

In one individual the sensation of pain was so acute as almost to mask that of cold, and yet the temperature did not fall in the opposite hand. (Exp. IV.) Similar results were obtained with others to whom cold water gave comparatively little pain, and markedly so in a lady who kept one hand immersed uninterruptedly for half an hour in water containing melting ice, the temperature of the other hand steadily rising for twenty-three minutes of this time. (Exp. V.)

A curious variation of this result was obtained in the same case on another occasion, when the subject of it was tired and the room sensibly colder than before. (Exp. VII.)

This last observation well illustrates some important points.

1. That nervous exhaustion of the subject of experiment, and coldness of the surrounding air, cause a fall in temperature which does not occur without them. 2. That this fall in temperature is not often coincident with a general sensation of coldness. 3. That *no* fall of temperature, so prompt as to

be fairly considered as a reflex act, follows the immersion of one hand in a freezing mixture.

2. When one hand was put into water as hot as it could be borne, which was with most persons from 110—120° F., it was found that the temperature of the other hand and of the feet rose from 0·8° to 3·4°, and that of the mouth under the tongue from 0·3° to 0·9°, the rise in the opposite hand and in the foot being equal. (Exps. XII, and XIV—XXIII.) The increase of heat was accompanied by a general sensation of warmth, sweat often breaking out on the unimmersed hand, and even over the body. These effects varied considerably in degree with the individual, and even in the same individual at different times. The temperature of the mouth rose in the case of the lady referred to above from 98·4° to 99·4°. (Exp. XIII.)

3. When hot water had produced the maximum effect just referred to, if the hand was removed, and it or one of the other extremities plunged into cold water and maintained there for some time, it was found that the temperature of the unimmersed hand and of the feet began to fall, and would in twenty or thirty minutes sink from 1° to 7·5°, the fall commencing very shortly after immersion. At the same time the temperature of the mouth would decrease from 0·6° to 1·4°. (Exps. XIII to XXIII.) A trifling sensation of chilliness was often coincident with this loss of heat, and persisted whilst it continued. A kind of reaction then took place, the chilliness passed off and the temperature rose; this could be hastened by warm tea, &c., and especially by immersion of an extremity in hot water; the latter method would in a short time arrest the fall of temperature when this was still going on and would again cause a rise, as just described, somewhat beyond the natural bounds. Experiments XIV and XVI illustrate this.

The results of these experiments may be thus summed up.

1. No change occurs in the temperature of any part of the body from the local application of cold, except that on which it immediately acts, unless the individual is in a state of more or less nervous exhaustion or there is decided coolness of the surrounding air.

2. The local application of heat exceeding in degree that of the blood causes a slight rise of the general temperature and a more considerable one of that of the extremities.

3. If cold is now applied locally—as to any one of the extremities—the general temperature falls slightly and that of the extremities more notably below the natural standard, but both this fall and the previous rise with heat vary considerably, not, however, with the individual susceptibility to painful sensations of temperature, but rather in proportion to the facility with which the conditions regulating the normal balance of the bodily temperature can be disturbed.

4. This change, unlike a reflex act, occurs comparatively, or even very slowly, and its amount is equal in all the extremities; hence it is not, at any rate in many cases, a reflex action, taking place between homologous parts, as Brown-Séquard has described it.¹

Perhaps these changes of temperature may be regarded as parallel in many respects with those attending a slight rigor. In both cases a disturbance, probably of the nervous system, sufficient to derange the conditions presiding over the maintenance of the natural temperature, seems first of all necessary. This may be due to heat, exhaustion from over-work, or want of food, or, in the case of disease, to a morbid poison. When the nervous system is thus, so to speak, taken at a disadvantage, slight impressions of cold may produce a rigor, as at the onset of pneumonia, or lowering of the heat of the extremities with slight chilliness, as in the artificial conditions related above. Even a true rigor, caused by a morbid poison, may be prolonged or induced by exposure to cold.²

¹ 'Journal de la Physiologie,' t. i, p. 505.

² On the subject of rigors see Wunderlich, 'Temperature in Disease,' Syd. Soc. Translation, pp. 172—199.

In both cases reaction from a state of lowered temperature occurs; in a true rigor the heat passes the natural limit and pyrexia is established, whilst in these experiments the normal temperature was slowly attained.

It would be undesirable to do more than suggest such an explanation, especially as the experiments of Dr. Brown-Séquard afforded such different results. It has been my wish rather to bring the facts observed under notice in such form as might best connect them with other and known phenomena, than to attempt to explain all the variations which occurred.

The cold air in which Brown-Séquard made his observations would, no doubt, modify the results; indeed, I have found this to be the case by actual experiment. (Exp. IX, *b*.)

Although the actual observations scarcely support Dr. W. F. Edwards's axiom,¹ "That we cannot either raise or lower the temperature of any one part of the body without all the other parts of the frame being affected and suffering a corresponding rise or fall in temperature, more or less, according to circumstances," as a general rule, they bear it out in particular cases and subject to certain conditions.

Dr. Handfield Jones² states that he has found that plunging one hand into hot water causes a speedy fall in the temperature of the opposite one. In my experience this was a comparatively rare occurrence, and did not usually exceed 0·1° or 0·2° F. (Exps. XIII and XVI.) In one instance, however, immersion of a *foot* in hot water caused an immediate fall in the temperature of the *hand* to the extent of 3·6°. (Exp. XVIII.) This had all the appearance of a reflex act, but,—and the remark applies to the whole subject of the paper,—this field of inquiry is so incompletely explored that we can well suppose the same end may be attained by different paths—that such changes of temperature may occur in some cases as the analogues of trifling rigors, in others by reflex agency. The practical lesson which the facts

¹ 'Todd's Cyclop.,' loc. cit.

² 'Functional Nervous Disorders,' 2nd ed., p. 34.

teach us, is that partial chills *can* modify the temperature, and that a condition of depressed nervous energy is one in which an individual is particularly exposed to the effects of slight impressions of cold.

The temperatures in the following tables are those of Fahrenheit's thermometer.

The extremes of temperature in each experiment, and the difference between them, have been printed in bold type for convenience of reference.

OBSERVATION OF TEMPERATURE PREVIOUS TO APPLICATION OF COLD.						APPLICATION OF COLD.			
Experiment.	Part of body in which tempera- ture was observed.	Tempe- rature of room.	Tempe- rature at the end of 5—10 minutes.	Tempe- rature at the end of 10—20 minutes.	Tempe- rature at the end of 20—40 minutes.	Name of extremity subjected to cold.	Tempe- rature of the water.	Time of immersion.	Remarks.
I.	Left hand.	...	...	...	96.3°	Right hand.	46°	20 min.	Water felt very cold.
II.	Left hand.	...	95.3°	95.3°	...	Right hand.	47°	10 min.	Ditto.
III.	Left hand.	...	...	...	97.6°	Right hand.	40°	30 min.	Ditto.
IV.	Right hand.	...	...	...	98°	Left hand.	36°	30 min.	Pain considerable.
V.	Right hand.	...	86°	89.2°	94°	Left hand.	36°	25 min.	Sensibility to cold slight. Temperature clef of fingers 55°.
VI.	Left hand.	...	96.2°	96.4°	96.4°	Right hand.	39°	20 min.	Hand was withdrawn from water at intervals as the pain was severe.
VII. (a)	Right hand.	...	...	...	96°	Left hand.	36°	15 min.	Considerable pain first, afterwards more bearable. Temperature in clef of fingers 52°.
(b)	Right hand.	...	...	...	93.4°	Left hand.	25°	13 min.	Pain moderate.
(c)	Right hand.	...	...	...	94.6°	Left hand.	26°	6½ min.	Ditto.
VIII.	Left foot. Mouth.	...	92.8°	95.5°	95.8°	Right foot.	56°	25 min.	Water felt cold. Ex- periment was made March.
IX. (a)	Left hand. Mouth.	...	95.9°	96.6°	96.6°	Right hand.	49°	20 min.	Water felt very cold.
(b)	Left hand.	...	...	...	98.2°	...	...	22 min.	Sat in draught on against the tap.
X.	Left hand. Mouth.	75°	...	97.2°	98.2°	Right hand.	36°	19 min.	Intense pain for seconds, more bearable afterwards.
XI.	Right hand. Mouth	...	...	92.5°	98.2°	Left hand.	36°	14 min.	Only moderately painful at first.

OBSERVATION OF TEMPERATURE SUBSEQUENT TO APPLICATION OF COLD

Temp. 1-2 min. after ap- plication of cold.	Temp. 3-6 min. after ap- plication of cold.	Temp. 8-10 min. after ap- plication of cold.	Temp. 12 -15 min. after ap- plication of cold.	Temp. 20 -30 min. after ap- plication of cold.	Greatest altera- tion of tempera- ture.	Remarks.
...	96.2°	96.3°	96.2°	96.2°	-0.1°	Hand grasping the thermometer and no bandage used
...	95.4°	96.3°	...	...	+ 0°	Ditto
...	...	...	97.7°	97.7°	+ 1°	A bandage was placed round the fist
...	...	98.2°	...	98.1°	+0.2°	Ditto
...	94.4°	95.8°	96.2°	96°	+2.2°	Ditto
...	96.2°	96.5°	96.8°	96.8°	+0.4°	Fist was supported by an elastic band
95.9°	96°	...	96.4°	96°	+0.4°	This observation was made on the same individual as V, but in this case she was somewhat exhausted. Directly after removing her hand from the water she felt chilly, and the temperature fell in twenty-five minutes to 92.8°, rising shortly after to 93.4°. Another observa- tion was made (b).
...	93.4°	...	...	...	0°	The temperature continued to rise when the hand was withdrawn from the freezing mixture. Obs. (c) was then made.
94.8°	94.8°	94.6°	...	...	+0.2°	Chilliness again came on, with a sen- sation of cold down the back, the tem- perature falling to 93°. A cup of hot tea was given, soon after which the chilliness passed off and the temperature rose.
95.7°	95.7°	96°	96.1°	96.2°	+0.4°	Bulb of thermometer placed under toes and foot lightly covered.
...	...	...	...	98°	0°	
...	96.2°	...	...	95.6°	-1.0°	The subject of this experiment moved to a tap of water which stood in a slight draught. No chilliness. See (b).
...	...	...	...	98.2°	...	
...	...	...	96.2°	95.2°	-1.2°	In this case the right hand was not put into water, but an equal fall of tem- perature occurred in a space of time equal to that of immersion in (a).
98.2°	98.3°	98.4°	98.4°	98.4°	+0.2°	This experiment and Experiment XI were made on two healthy adult males who had recently dined. The results in XI were almost precisely similar to those in X
...	99°	+0.2°	
98.1°	98.0°	98.2°	98.3	...	+0.1°	...
...	99.0	...	+0.2°	

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OBSERVATION OF TEMPERATURE SUBSEQUENT TO APPLICATION OF COLD



ON
A SIMPLE METHOD
OF
REMOVING SILVER WIRE WHEN EMPLOYED
IN CASES OF UNUNITED FRACTURE.

BY
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Received June 13th.—Read June 27th, 1871.

THE 'Medico-Chirurgical Transactions' contain numerous papers of great interest on the subject of "Ununited Fracture," and these contributions furnish us with various methods of inducing union of the fragments.

I propose to invite attention to a modification of the well-known plan of transfixing and holding the fractured ends in apposition with twisted wire.

The patient upon whom I operated is now under my observation at the Westminster Hospital. She is a short, thick-set, heavy woman, aged 47, who about two years ago fell down a flight of stairs, her whole weight coming on her left forearm. She sustained a severe compound fracture of the ulna about two inches from the wrist, and a simple fracture of the radius about three inches from the elbow. Pressure and

splints had been continuously applied from the time of the accident, yet bony union had not taken place, and when admitted into the hospital the limb was perfectly useless.

The case seemed to be one well fitted for that form of treatment of removing the ends of the fragments and fastening the bones together with a silver wire; but having occasionally noticed the difficulty there is in extricating the wire if applied in the ordinary manner, not to mention the possible risk of injuring or even of refracturing the bone, I tried a simple and, what I am led to believe, is a novel plan, of fixing the wire, so as to allow of its being readily removed at any time during the progress of the case, without damaging either the bone or the soft tissues, and with almost absolute painlessness to the patient.

On referring recently to Mr. Bickersteth's able paper read before this Society on March 8th, 1864, I find the following passage, which corroborates the dread I had previously entertained of injuring the bones in removing the wire:

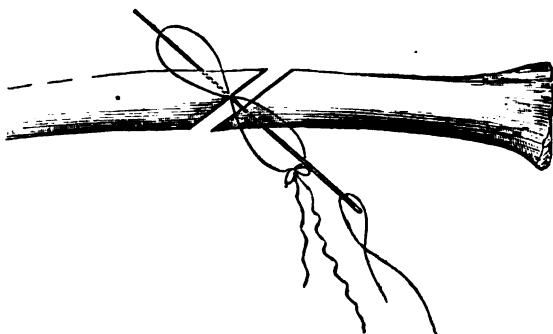
"In the case of a man admitted under his (Mr. Bickersteth's) care at the Liverpool Royal Infirmary with an ununited fracture of the radius, he drilled a hole through the ends of both fragments, and, passing a stout wire through it, secured the bone in perfect apposition. Union took place in seven or eight weeks, but on endeavouring to remove the wire so much traction was necessary that it caused the fracture again to be ununited."

In the case I operated upon I had no fear of doing damage to the ulna, because the fracture in this region was closely subcutaneous; but as the radius was broken high up at a part surrounded by muscles and other important structures, it appeared likely that this bone might suffer unless some means were employed to facilitate the removal of the connecting wire.

Hence the following operation was performed on April 18th, 1871, the steps of which, so far as the bones are concerned, will be readily understood by referring to the accompanying woodcut.

Commencing with the ulna, an incision was made down

to the seat of fracture, and the uniting band having been divided, the broken ends were exposed. The smooth surfaces, with as little as possible of the periosteum attached, were then sawn off diagonally, so that the upper and lower fragments exactly corresponded. The bones being then held in good position, a hole was bored obliquely through them with an ordinary carpenter's bradawl, and a needle (in this instance such as upholsterers use, with two pointed ends) was passed so as to secure the two extremities. The needle was then encircled by a loop of wire, the ends of which, having been firmly twisted on themselves, were made to emerge together with the needle from a small incision in the skin placed at



right angles to the larger wound. This opening was further useful in that it allowed the free exit of discharges.

It will be at once perceived that by removing the needle the wire must necessarily be disengaged.

The radius was treated in much the same manner, excepting that a finer wire was used, which was carried around the needle, not as a loop, but in the form of a figure of 8.

The larger wounds having been brought together by suture, the limb was placed on a splint and treated in the usual manner. The patient had no bad symptoms, and on Tuesday, June 6th, that is, seven weeks after the operation, the needles

being removed, the wires were withdrawn with the greatest facility.

That bony union is taking place is undoubted, the limb getting day by day firmer and stronger.

The proceeding above described may be compared to the ordinary operation of harelip, and is, in fact, an adaptation to the bones of a similar method employed in one form of acupuncture.

The consideration of the case suggests other ideas for future practice :—

1st. It is possible that the division of the fibrous bond of union may be dispensed with, the needle and loop of wire being alone employed.

2nd. That the needle may be shorter, so as not to press on the neighbouring structures.

3rd. That ivory or other material may be used in the place of the needle; and,

Lastly, that the wire, being released by withdrawing the needle, may be left for any length of time in the wound and allowed to work its way out, its removal, if required, being immediately effected by the slightest traction.

These are, however, minor details which do not affect the principle of the operation, which provides a means of removing the wire with the least possible pain to the patient, and without any risk of injuring the surrounding parts.

REPORT
ON
TWO SERIES OF CASES
IN WHICH
SYPHILIS WAS COMMUNICATED IN THE
PRACTICE OF VACCINATION.

BY
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THE following report contains the narrative of two separate series of cases. At the time of my first report (which was read before the Society on April 25th) only one of these had come under my notice, and at that date none of the patients in it had passed further than the primary stage. The discussion of this paper was adjourned for a fortnight, and during this interval the second series of cases had been brought under my notice. At the adjourned meeting I presented a report upon them, with also some further particulars regarding the first. A second appendix was presented to the Society at its last meeting (June 27th), bringing the narrative of both series up to that date. At that time many of the subjects of the second series had presented all the

symptoms of constitutional syphilis in its most typical form of evolution, whilst none of those in the first had shown any constitutional phenomena which could be pronounced beyond dispute. This difference I was inclined to explain by reference to the fact that all in the first series had taken mercury, whilst none of those in the second had had any treatment. That this suggestion was correct has been since proved by the occurrence, in four of the first group, of secondary lesions of the most unmistakable kind.

At the request of the Council I have remodelled my original paper, with its two appendices, and endeavoured to bring all the facts of both series into a continuous narrative up to the present date. As regards the main points, the cases will, I believe, be found amply sufficient, but I am well aware that respecting some individual ones there is less detail than could have been wished. The peculiar conditions under which the inquiry has been conducted, the necessity for avoiding any steps likely to excite the alarm of the patients, and other circumstances to which I need not advert, have prevented me from keeping all the cases under such close observation as might for some purposes have been desirable.

FIRST SERIES OF CASES.

SYNOPSIS.—Twelve persons, mostly young adults, vaccinated from a healthy looking child.—Satisfactory progress of the vaccination in all.—Indurated chancres on the arms of ten of the vaccinated in the eighth week.—Treatment by mercury in all.—Rapid disappearance of the primary sores.—Constitutional symptoms in four of the patients five months after the vaccination.—The vaccinifer showing condylomata at the age of six months.

These patients came under my observation in the seventh week after vaccination. The suspicions of the vaccinator had been excited about a fortnight earlier, and he had applied to the Medical Officers of the Privy Council on the subject. It was on the advice of Dr. Seaton that I was requested to see the patients

and investigate the matter. It was with the permission, and indeed at the suggestion, of the surgeon in whose practice it occurred (the father of the vaccinator) that the facts were made known to the profession, and I cannot help expressing here my admiration of the moral courage with which this gentleman met a calamity which caused him the keenest distress, and of the anxiety which he displayed that the fullest use should be made of it for the public good.

On February 7th, 1871, a young surgeon in the neighbourhood of London applied at a public vaccine station for a supply of lymph. He was offered a healthy looking infant of four months old, then on the eighth day, and with five good vesicles. As he wished to vaccinate a considerable number of persons in the same house, he preferred to borrow the child rather than, as first proposed, to charge points, and an arrangement having been made with the mother, the child was at once taken to a private house where eleven young adults (shopmen and servants) were vaccinated from its arm. Four only of the five vesicles were used, and the testimony, both of the operator and of the child's mother, is that more than one, and possibly all, of them bled somewhat. Finally, a tube was charged, and with the lymph thus obtained, which is reported to have looked quite clear, two persons, a father and son, residing in another house, were immediately afterwards vaccinated. Thus we have a total of thirteen persons vaccinated. In all excepting one doubtful case the vaccination was second to successful performance of the same in childhood. In the doubtful case both arms were done, in all the others only one arm. In all excepting one instance the vaccination took, and the vesicles are believed to have gone through their usual stages. The patients were not under any close medical inspection afterwards, as none of them needed it, but it seems certain from their testimony that at the end of three weeks in all cases the scabs had fallen and small round cicatrices alone remained. At the end of a month, or from a month to five weeks, several of them applied for advice because the scars were again becoming sore, and at the expiration of two months it was quite certain that ten

out of the twelve had indurated chancres on their arms. Many of them had more than one chancre, and about half had enlarged axillary glands, whilst two or three suffered from febrile disturbance with roseolous rash. I will append to this paper some brief notes of each of the cases, but it will be convenient for the present to restrict our attention to the general facts as to the group, and to turn next to the vaccinifer.

Facts as to the Vaccinifer.

The infant had been seen by the public vaccinator, whose patient she was, and by the surgeon who borrowed her, and to them, to her own mother, and to those who were vaccinated arm to arm from her, she bore the aspect of excellent health. She was remarkably well grown, not in the least fretful, and had gone through the stages of her own vaccination perfectly well.

On April 5th, two months after the vaccination, she was brought to my house for examination. Her mother ridiculed the idea that she ailed anything. My attention was, however, at once attracted to a slight peculiarity in the tint of her skin and to the look of her face; and although it was strongly denied that she had ever "snuffled," yet when she was made to cry I noticed a nasal twang which was very suspicious. On having her stripped not a single spot of rash could be seen on the skin, but on inspecting the buttocks five small circular condylomata were discovered close to the anus, about which there could not be the slightest doubt. Her mother now admitted that she had been aware for a week of the existence of these sores, and had consulted a chemist about them, who had attributed them to teething. She said they had not been present more than a week, and repeated her assurance that the infant had not seemed in the least ill. I could not find in the mother herself any indications of syphilitic taint, nor obtain any history of suspicious symptoms. She looked pale and cachectic, as if underfed. She had been married about eighteen months, and this was her

first-born child. Her husband was a Frenchman and one of the Paris National Guard. I prescribed for the child some mercurial ointment, and was very desirous to keep it regularly under observation, but the mother would not bring it. A fortnight later (on April 19th) I sought it out at home. The child then looked more ill than when I first saw it; the condylomata were in the same condition. It had no rash. Its head was enlarging, and its mother complained that it was wasting away. She had not used the ointment, alleging that its father would not allow her to do so. I was never able to see the father of the child, although I used every endeavour; he was evidently unwilling to be seen, and his wife positively refused to give me his address.

About the existence of constitutional syphilis in the infant at the date of my examination (two months after the vaccination) there could not be any doubt, and scarcely any as to the taint having been an inherited one. The vaccination spots presented perfectly healthy scars, and there was not the slightest reason for thinking that the disease was introduced into the child's system at the time of its vaccination. Had such been the case it is almost certain that it would now present symptoms similar to those in the patients vaccinated from it, *i. e.* primary sores on the arm. There could be only a week's difference in the stage of the disease in itself and in those vaccinated from it. Instead of this we find the child presenting the ordinary symptoms of hereditary syphilis—condylomata, commencing marasmus, and hydrocephalus. That a syphilitic infant should appear to be in perfect health as far as external appearances are concerned is by no means unusual. "It is a mistake to suppose that syphilitic infants always present a withered 'old-man-like' aspect; in many instances, although manifesting specific local symptoms, they may grow well and remain plump and fat."¹ This occurs, I believe, with especial frequency when the child does not suffer from a skin eruption, and under such circumstances condylomata are not unfrequently the only symptom by which the existence of the taint is proved.

¹ 'Aphorisms, &c., on Syphilis.' By the Author. 1862.

There can, I think, be little doubt that in this instance it was the blood, and not the vaccine lymph, which was the source of contamination.

Two of those vaccinated wholly escaped, and as they were two of the youngest on the list, and mere boys, it is very improbable that their immunity was consequent upon their having had syphilis before. In those in whom chancres occurred nearly half of the vaccination punctures escaped. Now, I can see no other explanation of this immunity of some persons whilst others suffered, and immunity of some vaccination punctures in the same person in whom others were infected, than by supposing that the vaccine virus and the syphilitic virus were present in different fluids, and that it was possible to convey the one in all its vigour without necessarily conveying the other. It is important in reference to this point to note that the two individuals who have escaped were the two who were first vaccinated, since it is not improbable that the lymph which first flowed was unmixed with blood. I may add also that the third person vaccinated was the only one in whom both arms were done, and that one of his arms escaped whilst the second suffered. The conjecture may be permitted that it was when obtaining lymph for this patient's second arm that the operator first drew blood.

The success or non-success of the vaccination, as vaccination, seems to have had nothing to do with the induration of the scars. Some scars in which the vaccination vesicle had not "taken" became indurated, whilst many punctures which did "take" escaped. Owing to the patients not having been constantly under observation after the vaccination, there is a little uncertainty as to which vesicles were well-developed and which failed, since we are obliged to rely to a considerable extent on the statements of the patients themselves. There seems reason to believe that the vaccination failed in all the spots in only one individual, and he subsequently had several indurated chancres at the sites of puncture.

The period of incubation seems to have been very nearly the same in all the cases. Two of the patients, a father and

son, noticed that their scars were becoming irritable on the same day, the 18th of March, a little more than five weeks after the vaccination, and between two and three weeks from the cicatrization of the vaccine vesicles. In all the patients the spots were characteristically indurated when I saw them on April 4th, exactly two months from the date of the vaccination. It would have been of great interest to science to have allowed half of this group of patients to abstain from any specific treatment, but, on the other hand, it appeared a paramount duty to adopt at once the very best means for their recovery. On the 4th April they all commenced, with one exception, the use of mercury in small doses and the application of black-wash. In all the effect of the remedy upon the local sore was most definite. Many of them, at the date of my first paper, had become (after eleven days' treatment) quite soft; in the course of a week none of them displayed a degree of induration which would have been considered characteristic, and several which had been ulcerated were healed.

One important feature in this group of cases is the remarkably close similarity which they bear to each other. In no single instance was there any unusual degree of inflammation of the vaccine vesicle. In all, as far as the patient's impressions go, the vesicles went through a usual course, and in all a period intervened, before the development of induration, during which the cicatrix was quite healthy. As the patients were not at the time under medical inspection it is impossible to be accurate as to the precise day on which induration of the cicatrices began, but so far as can be ascertained there is reason to believe that nine out of the eleven began to complain of inflammation of the scar towards the end of the sixth week. At the end of the eighth week these nine patients had all reached the same stage. In the other two cases the progress was about a fortnight behindhand.

The characters assumed by the sores were, with some minor differences as to size, &c., remarkably similar. Ulceration occurred in all excepting two patients, and in

one of these two, out of three chancres, one did for a day or two ulcerate slightly. In one patient, a healthy, florid girl of 17, three glossy buttons of induration formed, but never passed into the ulcerative stage. It is not improbable, however, that they were arrested by the influence of mercury. Of those which ulcerated all took the circular form, and in all, in the first instance, the discharge was stated to have been "glutinous." They had all been dressed with water dressing for several days before I saw them, and had much improved in appearance; some were then secreting healthy pus, but most of them still showed deficiency of secretion. None of the patients were out of health at the time of the occurrence, but they varied a good deal as to temperament and degree of vigour. There is no reason to think that any one of them had suffered from syphilis before. About half of them complained that they had headache and felt more or less unwell during the time that the sores were indurating. One young man was confined to his bed with severe aching in the back, vomiting, and general febrile disturbance, all of which passed off in a few days. Most of them had more or less enlargement of the glands in the axilla, but in none did it occasion any material pain or inconvenience. In all but one mercurial treatment was commenced on the 4th of April, two months after the vaccination, and about a fortnight after the scars had begun to indurate, and the uniformity with which all the sores altered in character under its exhibition was most remarkable. In the two cases in which ulceration had not occurred the sores never passed beyond the stage of induration. The sores which were ulcerated when mercury was begun, in the course of about a week after its commencement began to discharge healthy pus and to show florid granulations. Most of them, as already stated, were healed within a fortnight, and after three weeks the majority were quite sound and almost free from induration in all. In all cases the mercurial treatment consisted in two grains of gray powder given night and morning, with the application of black-wash under gutta-percha tissue. About half of the patients showed slightly the influence of mercury on the

mouth, but none were particularly inconvenienced. In one case the patient did not come under treatment till ten days after the others, having, indeed, in the first instance, consulted a homœopath. In him the chancre attained a size twice that of the largest of the others.

The following paragraphs are extracted without modification from my first report (April 25th), as I have special reasons for wishing to preserve their original form.

"As already stated, none of the patients have as yet displayed any of the persistent forms of skin rash, nor have any shown positive ulceration of the tonsils. Several of them have had transitory but definite eruptions of roseola, and in several the skin of the abdomen and chest is slightly mottled. Three of them to-day display about the neck, face, and shoulders, a few lichenoid spots of doubtful character.

"It is to be feared that before long we shall have yet more definite evidences of constitutional contamination in some of these patients; but in the present stage I think we are quite justified in deducing the following conclusions from them:

"1st. That the blood of a child suffering from inherited syphilis can, if inoculated, transmit the disease with great certainty.

"2nd. That the result of such inoculation of blood will be an indurated chancre.

"3rd. That if multiple inoculations be practised, multiple chancres may be produced.

"4th. That a period of incubation between the inoculation and the first occurrence of induration about the prick will occur, during which the part may appear perfectly healthy.

"5th. That the period of incubation prior to the first specific induration will usually be about five weeks.

"6th. That it is quite possible for vaccine lymph and blood to be transferred at the same time, and for each to produce its specific results, the effects of the syphilitic inoculation occurring subsequently to those of vaccination.

"7th. That it is quite possible to vaccinate successfully

from a syphilitic infant in the stage of utmost potency as regards its blood, without communicating syphilis.”

The following are some particulars respecting all the persons vaccinated in this series. The cases are arranged according to the order in which vaccination was performed.

No. 1. Master W—, æt. 14. He was vaccinated in three places, all of which took and went through their usual course. No ill consequences followed. On April 8th, I examined his scars and found them pale and quite normal.

No. 2. W. N—, æt. 16. Only one of three spots took. No ill consequences followed. On the 8th of April I found the scar of the vesicle which succeeded pale and healthy.

No. 3. Mr. T. B—, æt. 20, a young man of fair complexion and somewhat delicate appearance. As he had no scars of a former vaccination, it was thought best to vaccinate him on both arms. This was accordingly done in three places on each; in two or three on each arm the vaccination took and scabs resulted. He left the establishment shortly afterwards, and at the time of my first visit I did not see him. Having obtained his address, he was subsequently induced to come to my house. This was at the end of two months after vaccination. He had then one large ulceration with indurated edges and prominent granulations in the middle (see sketch). This chancre, which was as large as a florin, had resulted from the confluence of two vaccination sores. He stated, as regards the vaccination, that the scabs fell within three weeks, and that the sores then seemed quite well. During the sixth week two of the spots on his left arm inflamed and became hard, and during the following week he had a good deal of febrile disturbance. He had an enlarged but softish gland in the left axilla. Mercurial treatment¹ was commenced in the end of the ninth week, and continued for two months. The chancre was quite healed in about a month,

¹ By “mercurial treatment” throughout this paper may be understood the careful use of black-wash applied to the sore three times daily and protected with oil-silk, and the administration internally of two grains of gray powder twice or three times a day according to circumstances.

but the scar remained hard and dusky. He had a few suspicious lichen spots in the thirteenth week, but nothing characteristic. He never had any sore throat, and his general health remained throughout good.

No. 4. Mary Jane L—, æt. 18. Three spots took and went through their stages. About six weeks after the vaccination all three became inflamed, and they subsequently indurated. On April 4th they were all indurated and superficially ulcerated (see sketch). There was an enlarged gland in the axilla, movable, but not very hard. During the preceding week she had had some febrile disturbance. Mercurial treatment was commenced at the end of the eighth week, and was pushed to slight ptyalism. She subsequently had some diarrhoea and could not continue the mercury regularly. The chancres soon healed. In the thirteenth week she reported that she had a rash, which came and went, but I never saw anything positive. She was of strumous diathesis, and a large glandular mass in the neck, which had shown itself in the eighth week, persisted ever afterwards. In the middle of July, all specific treatment having been suspended for more than two months, she had a rash on the neck, fronts of arms, &c. It consisted of small, slightly scaly papules, of dusky colour. She had also symmetrical ulcers in the tonsils. Mercurial treatment was at once recommenced and the rash soon began to fade. The was seen a few days later by the Society's Committee. On August 1st all traces of the rash had disappeared, but the ulcers in the tonsils persisted. On September 4th she was seen by Mr. Smith, Secretary of the Committee. At this date she had no rash, but the ulcers in the tonsils were still characteristic.

No. 5. Caroline R—, æt. 24, stout and florid, was vaccinated in three spots, two of which took slightly and one well. After they had been for some time soundly healed, they relapsed about the 20th of March and became red and irritable. She had at this time backache and flying pains. There was no swelling in the axilla. Mercurial treatment was commenced at the end of the eighth week, and was

pushed to decided salivation at the end of ten days, after which she took only one pill daily. At the end of a month the sores were all healed and the scars soft. She had on several occasions shown a few suspicious spots about the neck, but nothing characteristic, and she had had no sore throat. Throughout she had complained a good deal of rheumatoid pains, &c., but she kept at her work. In the middle of July, at the same time as in the preceding case, a characteristic rash attended with ulcers in the tonsils showed itself. Mercury, which had been suspended for two months, was resumed, and the rash soon disappeared. On the 1st of August she was quite well, with the exception of two or three spots which persisted on her neck. In the beginning of September, however, she had a relapse of ulceration in one tonsil, but it was very slight. Her general health at this time was good.

No. 6. Annie W—, a florid robust girl, æt. 17. The three vaccination spots took well, went through their normal stages, and healed. On April 4th (eighth week) the outer one showed slight induration, but was not in any degree ulcerated. The other two were reddened, but not at all hard.

She said that they were redder than they had been a week before, and that they were beginning to itch. She felt perfectly well. Three days later all three spots had become slightly harder. (*Sketch now taken.*) None of them ever passed into open ulcers, and under mercurial treatment all induration disappeared in the course of three weeks. I believe she took the mercury afterwards very irregularly. No constitutional symptoms of any kind ever showed themselves.

No. 7. Lucy L—, æt. 20. All the four vaccination punctures took well, and healed in due course. Nothing followed until the last days of March (beginning of eighth week), when the two inner spots became red, hard, and irritable. On April 4th the two outer scars still showed no sign of irritation, but the two inner ones were of a dusky red, somewhat raised, hard, and covered with thin epidermic scale.

She complained that they felt sore. She had no other symptoms. No axillary bubo. In this case the chancres never ulcerated. Under the influence of mercury the induration disappeared. For a short time in the tenth week her tonsils were suspiciously inflamed, but she never had any rash. Cod-liver oil was given most of the time, as she was in delicate health, and had a cough.

No. 8. Mr. T—, æt. 20. Three vaccination places took, and the fourth did not. These scars remained quite sound until April 1st (eighth week). I saw him on April 8th, and found one of the scars inflamed, slightly hard at the base, and covered with a scab. The other three were quite quiet. He said that he felt well. There were some hard glands in the axilla. Mercury was at once commenced, and the sore, which had ulcerated, soon healed. The mercury never produced any pyalism, and, excepting a little headache, he felt quite well throughout. On the 5th of May the scar was sound, but still hard, and the glands in the axilla could still be felt. My notes mention "some small spots on neck and shoulders, fairly characteristic." The spots alluded to had disappeared at my next visit. He subsequently remained quite well until the middle of July, when he had a general roseolous eruption, which, however, disappeared in a week when mercury was resumed.

No. 9. Mr. H—, æt. 22, of fair complexion, and delicate. Lymph was inserted at three places, and good vesicles developed at two. They all healed well, but about March 20th the inner one began to inflame. On April 4th, when I saw him, he complained of having felt dull and heavy during the last week. The spot which had inflamed was raised and hard. On each tonsil there was a slightly marked patch of suspicious appearance, but not actually ulcerated. Mercury was commenced at this date. The chancre soon healed. The throat was slightly sore for about a week, and after this, excepting some complaint of frontal headache, he had no symptoms. On May 5th the chancre, which had been healed for more than a week, scarcely showed any induration. He felt quite well, and had no rash. Mer-

cury was continued once a day for a month longer, and then disused.

No. 10. Mr. W—, æt. 18, a rather delicate young man of dark complexion. He was vaccinated in three places, but none of them took. The inner one inflamed a little, but soon healed. On the 22nd of March the inner one had again inflamed, and was becoming hard. On April 1st he felt ill, had backache, thirst, and headache; and on the 2nd a succession of slight rigors with frequent sickness came on. When I saw him on April 4th he was in bed on account of his backache and feverishness. There was an enlarged gland in his axilla, and the skin of his abdomen was a little mottled. Only one of the vaccination spots was affected, and it was exactly like those in the other cases—raised, hard, and inflamed. Nothing could be seen on his tonsils. On April 8th he was much better, having lost his backache. He stated that on the 7th his body and face were covered with a blotchy rash, but, with the exception of a very slight mottling of the abdomen, this had disappeared on the 8th. On the 5th of May he had congestion of the right eye and circumorbital pain, but no positive iritis resulted. At the same time he had a lichenoid eruption on shoulders, arms, and face, but as it was mixed with acne, to which he had been previously liable, it was not easy to be confident as to its character. On account of diarrhœa the mercury had been omitted.

No. 11. Mr. W—, aged 45, a married gentleman, the father of a healthy family, and who had never, at any time, suffered from syphilis. He was vaccinated in three places, two of which took, went through their stages, and cicatrized. The middle one of the three did not take. On or about March 18th all three inflamed, and when I saw them on April 4th they were all indurated and ulcerated. He had no enlarged glands, nor any other symptom. On April 8th his condition was much the same; he was taking mercury twice a day; the thermometer had been used regularly and had not shown any elevation of temperature. On the 11th the mercurial was omitted, as he was decidedly salivated. On the

14th two of the sores were quite healed and the other showed healthy granulations. After this he continued the liberal use of black-wash, but took no more mercury internally. From the 10th to the 24th his mouth was slightly sore, and the mercurial odour was perceptible in his breath. Subsequently he remained quite well as regards syphilitic symptoms until the latter end of June. We had sent him to the sea-side, as he had not regained quite his ordinary strength. Whilst there he rapidly improved, but a copious eruption came out on his scrotum, thighs, and scalp. He thought it had been excited by bathing. He returned to town three weeks later, and I saw him in the middle of July. His scrotum, penis, and the inner sides of his thighs were covered with flat-topped papules and patches of psoriasis of the most characteristic kind. He had no rash worth mention on other parts of the body, but his scalp, which was bald, was covered with small patches of porrigo. Under the use of a mercurial ointment and small doses of mercury internally both the scrotum and scalp rapidly healed.

No. 12. Mr. W—, junr., æt. 18, son of the subject of Case 11. He was of brown complexion and in tolerable health, but had been for years the subject of enlarged tonsils. Three out of four of his vaccination spots took, went through their usual stages, and healed. On the 18th of March two of the three spots which had taken had become a little inflamed and irritable, and during the next week they gradually indurated. He consulted his surgeon about them on the 24th, and on April 4th I saw him. The outermost of the three spots then showed a healthy cicatrix, but the inner and middle ones were inflamed, slightly raised, superficially ulcerated, and decidedly indurated at the base. Their condition is shown in a sketch taken at this date. He had no other symptoms. No definite glandular swelling. Mercury was prescribed, and under its influence the sores softened and healed. He was never positively salivated, but the occurrence of slight diarrhoea several times interrupted the mercurial course. Up to the present date he has not had any secondary symptoms, with the exception of a doubtful roseolous rash in the begin-

ning of May. He took mercury in all for about a month.

SECOND SERIES OF CASES.

SYNOPSIS.—*Unquestionable symptoms of constitutional syphilis in nine children who had been vaccinated from the same patient.—Suspicious symptoms in six others, and entire escape of a certain number.—Vaccinifer a fine healthy looking child, but with slight local symptoms indicative of inherited syphilis.*

On May 5th, 1871, two children were brought under the care of my friend and colleague, Mr. Waren Tay, on account of syphilitic eruptions. They were a brother and sister, aged respectively 4 years and 16 months, and in both the syphilitic rash was very definite. In searching for its cause Mr. Tay found that about seven weeks previously they had been vaccinated, and that the vaccination spots were at the present time unhealed, and with very decided induration at their bases. Mr. Tay now brought the cases to me, and I am indebted to his courtesy for permission to investigate the facts respecting them, and also for much help in doing so. We obtained from the mother of the children the name of the vaccinator, and on application to him were at once supplied with his vaccination register, and allowed to copy out the names and addresses of twenty-four other patients who had been vaccinated at the same time from the same vaccinifer. Nothing had occurred to excite the vaccinator's suspicions, not a single one of this series having been taken back to him on account of the unhealthy condition of the arm. On making inquiries at the houses of the patients, however, we found that no fewer than nine had chancres on their arms, and that six were suffering from well-marked and copious syphilitic rashes. Two of them had been under other medical care for these symptoms, but in not a single case had the real nature of the disease been suspected. I will state

seriatim the chief facts respecting the cases in this series, but it will be convenient first to mention those which concern the vaccinifer.

History of the vaccinifer.

I visited the child at its home, the parents having no knowledge of the object of my visit. I found it a stout, well-grown male infant, of seven months old. Thus, he would be four mouths old at the date of vaccination. His mother stated that he was selected as a vaccinifer from amongst several others, as being the most healthy present, and that his vaccination spots were very good ones. They healed afterwards quite well, and the scars remained sound. He still looked healthy, and was well grown and cheerful. Excepting a little transitory "tooth-rash," probably lichen, on the face, he had had no eruption. His head was decidedly large, and the fontanelles widely open. This had, his mother said, only been noticed for a few weeks. .Latterly several neighbours had told her that he had "water on the brain." I inquired as to snuffles, and she replied at once and emphatically, "Yes, he has snuffled a great deal." There was no trace of rash in the child's skin at the time of my visit, but at the anus was a single small condylomatous patch just healing. This had never attracted his mother's attention. He was said to have had thrush. His mother was a young and healthy-looking woman, who had been married two years. I did not, of course, ask her any direct questions.

Immediately afterwards I called on the father of the child, and in answer to a direct question he denied very positively having ever been the subject of venereal disease. On a subsequent occasion he submitted to a personal examination at my house, and we failed to detect anything of a nature to cast suspicion on his denial. I saw the infant two or three times during the next six weeks, but no symptoms of a more definite character showed themselves. The condyloma soon healed, and, with the exception of a slight tendency to hydrocephalus, the infant at the time I last saw it might

have been regarded as a specimen of excellent health. As regards its condition at the date of the vaccination I may state that the parents of several of those vaccinated from it subsequently mentioned to me its very healthy appearance.

No trustworthy evidence could be obtained as to whether blood was or was not transferred in the act of vaccination. The vaccinator, who is a very able and careful surgeon, assured me that it was his custom to avoid blood-stained lymph, and several of the women who witnessed the proceedings told me that they did not observe any bleeding. In addition to the number of children vaccinated directly from its arm some tubes were also charged with its lymph. These tubes, having been mixed with others, could not be traced.

The following are the particulars of all the patients vaccinated from this vaccinifer.

No. 1. Arthur Edward T—, æt. 16 months, one of those first seen by Mr. Tay. He had been vaccinated for the first time on February 13th, and five of the punctures were successful. The spots healed, but subsequently became hard. When he applied to Mr. Tay in May the scars were decidedly indurated, but not ulcerated; there were enlarged glands in the axilla; he had symmetrical ulcers on the tonsils, and a moderately copious rash of mixed roseola and psoriasis on the trunk and limbs. He was treated by mercury, and his symptoms slowly disappeared.

No. 2. Elizabeth T—, æt. 4 years, sister of the above patient. She was vaccinated for the first time at the same date, and five of the punctures took well. They went through their usual stages and healed. Afterwards the scars inflamed and ulcerated. When she was seen by Mr. Tay on May 5th she presented superficial sores with slightly indurated bases, and covered with a good deal of scab on the seat of the vaccination scars (see sketch). The glands in the armpit were enlarged. She showed deep symmetrical ulcers on the tonsils nearly healed, and she had a copious rash of papules and small scaly patches on the body, the colour, arrangement, and general appearances of which were most

characteristic. This eruption was symmetrical, and occurred especially on the back of the neck, the bend of each elbow, and the thighs and hips. Under mercurial treatment the chancres healed and the rash disappeared.

No. 3. William C—, æt. 10 years. His was a second vaccination, but three of the punctures were followed by good vesicles. The vaccination spots were healed. He became the subject of general rheumatoid pains, and had a copious rash over the whole body. When seen by me at the end of the thirteenth week he had already been for several weeks under medical treatment. The vaccination chancres were just healed, but were still inflamed, indurated, of a dusky red colour, and covered with a dry papery scab. There was a gland as large as a walnut in the axilla. Each tonsil showed a well-marked gray-based ulceration. The rash, although evidently fading, was still abundant. It occurred symmetrically on the neck, arms, trunk, and thighs. It was copious both on the backs and fronts of the arms, and especially so on the outsides of the thighs. A sketch of his arm was kept.

No. 4. Eliza T—, æt. 14, a revaccination; four or five of the punctures took; the crusts fell in about a fortnight, and the scars remained sound for three weeks afterwards. Five weeks after vaccination they inflamed and became hard, and "a white skin came over them," but they never re-ulcerated. She had a painful lump in the armpit during the first wee after vaccination, but it subsequently disappeared. During the twelfth week she first noticed an eruption on the chest, and at this time she had some cough and felt ill, as if she had taken cold. She was now placed under the care of a surgeon. I first saw her on May 17th, the first day of the fourteenth week. At that date her vaccination spots were soundly healed, but the scars were dusky and covered with a papery scale; none of them were indurated. There was a slightly enlarged movable gland in the armpit. She had symmetrical ulcers in the tonsils, with white borders. There was a sparing eruption of dusky lichen spots on her chest, chiefly below the nipples. There were a very few spots also

on the chest and upper part of the neck, but none on the arms. Up to this date the patient had taken no mercury.

No. 5. Maria H—, æt. 3; a first vaccination; four punctures took. When visited in the fourteenth week she was found to have symmetrical ulcers in the tonsils, a slightly enlarged gland in the axilla, and an eruption of dusky psoriasis on the back and outer sides of the thighs. One of the vaccination scars was slightly indurated and dusky, with a thin papery scale; the others were sound. The rash had only been noticed for a few days. The child had been for some time under the care of a surgeon for "inflammation of the lungs." Up to this date the child had taken no mercury, and the treatment afterwards was conducted with extreme irregularity. On September 6th, after an interval of two months, during which the child was lost sight of, it again came under care on account of condylomata at the anus.

No. 6. Eliza M—, æt. 15; revaccination; four places took. On May 16th, end of the thirteenth week, the sores had only just healed, and their scars were slightly indurated, dusky and covered with a dry scale. There was a slightly enlarged gland in the axilla, and she had a few scaly papules of dusky-red colour on the upper parts of the legs, but none elsewhere. She was florid and in good health.

No. 7. This patient, Hannah S—, was not found.

No. 8. Elias W—, æt. 1 year; a first vaccination; four punctures took. At the end of the twelfth week the sores were not healed, but were covered with porrigo scab. There was, however, no evidence of syphilis, and the child had been the subject of porrigo before vaccination.

No. 9. Mary Anne O—, æt. 11; a revaccination; five places took. The sores healed very slowly, and had only just closed at the end of the thirteenth week. Their scars were then dusky and red, with a thin dry scale and slight induration. There were a few dusky papules on the back of her neck, and one in front of the right elbow. The patches were either smooth and glossy or covered with a thin scale. There was a large indolent swelling in the axilla. The child had not been out of health, and no treatment had been adopted.

No. 10. Amelia O—, æt. 5 years ; first vaccination ; five places took. The sores healed in about five weeks, and the scars, when examined at the end of the thirteenth week, were scaly and somewhat congested, but not indurated. The axillary glands were slightly enlarged. She had no eruption excepting some patches of dry eczema on the face. It is probable that she was not syphilitic.

No. 11. Frances C—, æt. 4 years. I do not know more respecting this child than that the vaccination sores healed slowly, and that during the eighth week she had a rash of red pimples. She was not seen.

No. 12. Alice C—, æt. $5\frac{1}{2}$ years, sister of the above. Facts as to vaccination very similar.

No. 13. Henry C—, æt. 8 years, brother of the above. On May 8th, end of twelfth week, two or three of his vaccination spots were still unhealed and covered with porrigio scab. He was reported to have had a rash like his sisters, but neither in him nor them was there anything positively syphilitic.

No. 14. Emily Julia J—, æt. 6 ; first vaccination, five places took. The places healed up at the end of the third week, but subsequently inflamed and reopened. On May 17th, fourteenth week, the four lower spots were healed, but hard, glossy and dusky. The upper one was covered with a dry pus-scab and its base, as large as a shilling, considerably indurated. She had an enlarged gland on the border of the axilla. The lower part of the chest, the whole of the abdomen and the back was covered with a lichenoid rash, and there were a few spots on the front of the elbows and on the thighs. The rash had probably been out about a fortnight. There were symmetrical ulcers in the tonsils, and she had been low-spirited and ailing. Mercurial treatment, one grain of gray powder twice a day, was commenced on the 17th. On the 30th all traces of the rash and of the ulcers in the throat had disappeared, and she was in good health. The vaccination scars were still dusky and somewhat indurated.

No. 15. Alfred J—, æt. 9, and brother of the above. A first vaccination ; five places took, and all healed during

the third week. They afterwards inflamed and reopened. In the beginning of the fourteenth week the scars were dusky, and there was an enlarged gland in the axilla. He had no rash of a positive character, but a suspicious mottling of the skin of the abdomen.

No. 16. Annie J—, æt. 3 years, sister of the above. All the four vaccination punctures healed well in the usual time, but subsequently reopened. An abscess formed in the armpit and broke. It was said that she had scarlet fever soon after the vaccination. At the beginning of the fourteenth week all the sores were well healed, but the scars were slightly dusky. She had no rash.

A young woman who was vaccinated from this child suffered no ill consequences.

No. 17. Herbert D—, æt. 5 years. In this case nothing unusual occurred.

No. 18. Alfred George H—, æt. 1 year. In this, as in the preceding, the vaccination was successful and without any untoward result. Both of them were first vaccinations, and in each some places took.

No. 19. Eliza C—, æt. 16 months. In this instance the vaccination, first, was not successful, but nothing followed it.

No. 20. Rose Jane B—, æt. 3 months. I did not succeed in obtaining any information about this child, and the same remark applies to the three following cases.

No. 21. Rosina T—.

No. 22. Daniel C—.

No. 23. John C—.

No. 24. Caroline W—, æt. 18 years, a revaccination; three places took. The sores never quite healed. About the fifth week they inflamed considerably. An abundant eruption appeared in the eighth week, and at the same time she failed in health, lost her appetite, and had pains in her limbs. When seen in the beginning of the fourteenth week she had a large open sore on her arm, with indurated elevated edges, and prominent florid granulations in the centre. This sore was formed by the coalescence of two; a third was healed, but indurated. She had symmetrical excavated ulcers in the

tonsils, and enlarged glands in the axilla and back of neck. She had a copious eruption of dusky flat-topped papules, occurring on almost all parts excepting the face, and there was also a single, round, condylomatous patch on her tongue. A sketch of her arm was taken on May 19th, and on the same date she was seen by many surgeons. Mercurial treatment was commenced on May 17th. On May 31st she was rapidly getting well, the rash having almost disappeared and the sore being nearly healed. On June 21st the sore on the arm was healed, but its scar was dusky and covered with scales; the only constitutional symptoms which remained were a few spots on the neck and the condyloma on the tongue. Subsequently this child got quite well, but she had to take mercury for more than two months. Towards the end of July she was again under care for a small condyloma at the anus, but it soon disappeared under treatment.

No. 25. Harriet W—, æt. 15 years; revaccination; successful; no ill consequences.

No. 26. John R—, æt. 8 years. A successful first vaccination. No ill consequences.

Note.—In the preceding pages I have several times alluded to sketches taken. I possess a series of drawings (by Mr. Burgess) illustrating different forms of the vaccination chancre, the character of the rash, &c. These I shall at any time have much pleasure in showing to any one who may wish to see them.

REPORT
OF A
SUB-COMMITTEE
OF THE
ROYAL MEDICAL AND CHIRURGICAL SOCIETY
ON SOME OF THE
CASES RELATED BY MR. HUTCHINSON
IN THE PAPERS READ AT THE MEETINGS OF THE SOCIETY
ON APRIL 25TH AND MAY 9TH, 1871.

ON May 16th, 1871, we saw, in company with Mr. Hutchinson, the following cases :

The vaccinifer of the first series of cases reported on April 25th, and three persons (Cases 1, 2, 3) who were vaccinated from this child.

Vaccinifer (No. 1), female, æt. 7 months. Had been used on February 7th for vaccinating the series of cases reported by Mr. Hutchinson on April 25th.

This child is hydrocephalic ; its head is much elongated and widened posteriorly ; the fontanelle is somewhat more open than usual. It is pallid, but not unhealthy looking. There are five marks on the left arm from vaccination which are quite healed. No eruption can be seen anywhere, the anus and genitals are quite clear, but the mother states that there

were sores on the latter after vaccination. The glands in both groins are large, and can be very distinctly felt.

The *mother* is rather pale, but looks healthy, and declares she has always been so. This is her first child.

The following persons were vaccinated from the preceding case on February 7th, and presented on May 16th the following features :

CASE 1.—Female, æt. 17, No. 6 in Mr. Hutchinson's first series; a hearty, robust, plump girl with bright colour. Has in a horizontal line, three vaccination marks on the left arm the outer of which is not yet healed; the base of this sore is very slightly thickened.

Mr. Hutchinson states that this girl has been living at home with her friends, and taking her medicine very irregularly.

CASE 2.—Male, æt. 18, No. 10 in Mr. Hutchinson's first series. A dark complexioned, strumous-looking lad. Has three cicatrices on his left arm, which present nothing different from recent vaccination marks. There are a few small scattered spots of acne on the shoulders and upper part of chest.

CASE 3.—Male, æt. 19. A healthy-looking lad. Has an unhealed ulcer, larger than a shilling piece, on the right arm, resulting from vaccination. The sore is covered by a crust which is disposed to scale slightly, and its base is leathery. Nothing else can be detected.

Mr. Hutchinson states that this is the last case of the series which had been traced, and therefore treatment was commenced later than in the others. He also informs us that in the above three cases the vaccination sores all healed, and subsequently ulceration set in at some of them, which continued to spread slowly until mercury was given, when in about ten days they commenced to heal. Black wash was applied locally. The same sequence of events had occurred in all the other cases of this group that we had seen.

From the foregoing account it will be seen that neither

the vaccinifer, nor any one of the three cases vaccinated from it, presented any symptoms of constitutional syphilis at the time of our examination. But whilst in Case 2 the vaccination sores were healed, leaving nothing but the ordinary scars, in Cases 1 and 3 there were still open ulcers at the site of the vaccination fourteen weeks after its performance. These ulcers were of a suspicious but not of a conclusive character.

Of the second series of cases reported by Mr. Hutchinson we have seen the vaccinifer (No. 2), and three children (Cases 4, 5, 6), who were vaccinated from it.

Vaccinifer (No. 2), male, æt. 7 months. Had been used on February 13th for vaccinating the series of cases reported by Mr. Hutchinson on May 9th, and brought under his observation by Mr. Waren Tay.

This child is hydrocephalic; its head is universally enlarged; the fontanelles are perhaps more open than usual. It is a pallid delicate-looking child, and has a slight herpetic eruption on the forehead, but is very lively. It breathes hard through the nose; the mother says it has a cold, and is teething. There is a small white scar at the anus, as if from an ulceration. The glands in both groins are large and separate. On the right are five vaccination marks, which are all healed.

The *mother* is a bright complexioned healthy-looking woman and has never suffered from illness. This is her first child. She has never had a miscarriage, or discharge, or sore nipples. She says the child has been occasionally nursed by the landlady and her children. She knows that one of these was ill, and was sent into the country for its health, and that the mother had attended a hospital, but she never heard what was the matter with either of them.

The *father*, æt. 27, cabinet maker, is a spare pale man, but apparently in health; he has worked thirteen years in the same situation. He denies having had venereal disease of any kind, and readily submitted to examination without previous preparation; nothing could be found except some

enlarged separate glands in the left groin, and a slight white scar on the inside of the cheek, opposite to the left molar tooth. The only illnesses he has ever had are measles and whooping-cough.

The following cases which had been vaccinated from this vaccinifer on February 13th, presented the appearances detailed below on May 16th, thirteen weeks afterwards.

CASE 4.—E. T—, a girl, æt. 4½ (No. 2 in Mr. Hutchinson's second series of cases), a pallid, thin, strumous-looking child. On the right arm are two sores covered by crusts; the larger of these has a circumscribed thickened base, which is superficial, and has a leathery feel when compressed; the surface of this is disposed to scale. The glands in the corresponding axilla are enlarged. There is a scaly eruption, consisting of small circumscribed, for the most part circular, spots of a coffee colour at the back of the neck, the lower part of the abdomen, and the upper and outer part of the thighs, with a general scattered mottling of the trunk, on its anterior surface especially. The inguinal and post-cervical glands are large and distinct. Both the tonsils are excavated, but not now ulcerated.

CASE 5.—A. E. T—, a boy, æt. 18 months, male (No. 1 in Mr. Hutchinson's series), a fat, well-grown, hearty-looking child. On the left arm are two large dusky-coloured marks of vaccination, which are scaling on the surface, but not ulcerated; these have a thickened base, precisely similar to the preceding case. There is a general mottling of the trunk, which is fading, and a few small scaly spots, resembling those in the foregoing patient, scattered over the abdomen. The glands in each groin are very distinct. There is well-marked ulceration of both tonsils.

The *mother* of these children is a healthy-looking woman, she has never suffered from illness; a rigid cross examination failed to elicit any history of previous syphilis in herself or either of her children.

CASE 6.—W. C—, æt. 10, a boy (No. 3 in Mr. Hutchin-

son's second series. This case was not reported at the Royal Medical and Chirurgical Society), a spare lad, but not unhealthy in appearance; his mother says he has lost much flesh lately. On the left arm the cicatrices of vaccination in infancy show plainly, and below these are two large sores covered with crusts with well-defined thickened circumscribed bases, surrounded by a dusky areola. The glands in the corresponding axilla are enlarged. The inguinal and post-cervical glands are very perceptible to touch. There is a scaly eruption, for the most part in small annular patches, over the trunk and limbs, which is fading. On each tonsil is a deep vertical ulcer with a gray unhealthy surface.

The *mother* is a tall healthy-looking woman; she has never had any serious illness, and no history of previous syphilis in herself or her boy can be obtained. These three cases were vaccinated on the same day and the ulcers resulting have never healed, but have slowly increased in size. There has been no treatment in any of them.

In our opinion these three cases present unequivocal evidence of constitutional syphilis, and we see no reason to doubt, from the appearances presented by the arms and from the history of the cases, that the disease had been conveyed by vaccination.

As to the method in which vaccination was performed in these cases and the character of the fluid inoculated, whether lymph, blood, or both, we could obtain no satisfactory evidence; and with regard to this question we may refer to the remarks made by Mr. Hutchinson in his paper, where such facts as could be elicited are recorded.

(Signed)

SAMUEL WILKS,
WM. S. SAVORY,
GEO. G. GASCOYEN,
THOMAS SMITH.

The following case was shown to Dr. Wilks by Mr. Hutchinson, on May 19th, being one of the same series.

CASE 4.—Female, æt. 14. No. 4 in Mr. Hutchinson's second series. There was a round red sore on the arm, raised and granulating. Over the body and arms was a well-marked eruption of bronze-coloured, scaly, raised spots. The tonsils were swollen and slightly ulcerated.

(Signed)

SAMUEL WILKS.

SECOND REPORT
ON
CASES OF VACCINO-SYPHILIS.

THE following cases—belonging to the first series reported by Mr. Hutchinson on April 25th—were seen by us on August 1st, 1871, with Mr. Hutchinson and the medical attendant. They were vaccinated on February 7th from vaccinifer No. 1; all have been, and still are, taking mercury; in one or two of them the gums are slightly reddened. They belong to the group first described in the previous report, so that eight of that series have been seen by the committee.

CASE 1. C. R—, Female, æt. 24. No. 5 in Mr. Hutchinson's first series. A plump, robust woman, with fresh colour, is apparently in perfect health. On the left arm are the cicatrices of three vaccination marks, which are quite healed: they are of a dusky brown colour, but opinions differ as to whether they are darker than usual. There are three or four scattered spots of acne on the chest and back. The throat is sound. Mr. Hutchinson states that this patient has never had a characteristic rash.

CASE 2. M. J. L—, Female, æt. 18. No. 4 in Mr. Hutchinson's first series. A pale, delicate-looking girl, but does not appear to be out of health. There are three cicatrices from vaccination in a horizontal line on the right arm, which are quite healed and somewhat dusky in colour. The glands beneath and behind the angle of the left lower jaw are enlarged, forming a mass which extends over the parotid

region and downwards into the neck. There is one enlarged gland at the back of the neck on the right side. In each tonsil is a vertical, excavated, unhealthy-looking ulcer. At the bend of the right elbow is one red spot which is scaling, and another less distinct on the left arm at the same situation.

CASE 3. C. T—, Male, æt. 20. No. 8 in Mr. Hutchinson's first series. A short but rather thickset man of fair complexion; looks, and says he is, quite well. On the left arm is one dusky-coloured cicatrix of vaccination, quite healed. A few small spots of acne are scattered over the upper part of the chest. The fauces are slightly congested, but there is no ulceration.

CASE 4. H. H—, Male, æt. 22. No. 9 in Mr. Hutchinson's first series. A very fair man, with a particularly clear, white skin and bright colour, appears to be in perfect health. On the left arm is one dark-coloured cicatrix from vaccination quite healed. The tonsils are large and red, but not ulcerated. In the centre of the back, below the scapulæ, is a superficial patch somewhat coppery in colour, desquamating slightly and fading off.

CASE 5. W. W—, Male, æt. 18. No. 10 in Mr. Hutchinson's first series. A dark-complexioned man, spare and short; looks to be in general health. On the left arm is a deep-coloured vaccination scar, not raised and quite healed. A few spots of acne are scattered over the shoulders. The fauces are a little congested, but not ulcerated.

WM. S. SAVORY,
GEORGE G. GASCOYEN.

On July 25th, 1871, in company with Mr. Hutchinson and the gentleman who vaccinated the cases reported in the first series, I visited a large business establishment in order to examine several of the persons who had been vaccinated from vaccinia No. 1, already reported on.

No. 1. J. L—, a girl, æt. 18 (No. 4 in Mr. Hutchinson's first series). She showed three vaccine marks on one arm of a brownish colour. On her body and arms there were a few, small, copper-coloured, scaly blotches. I counted about a dozen in all. Her throat showed a deep excavated ulcer on the right tonsil, and on the left two or three smaller and more superficial ulcers. The posterior cervical glands were enlarged, and on the left side under the jaw there was a circumscribed lymphatic gland much enlarged.

No. 2. C. R—, a cook, æt. 24 (No. 5 in Mr. Hutchinson's first series). On her arm there were two vaccination marks; these presented no remarkable appearance. On examining the neck and body there were seen a few very faint blotches. These would have been scarcely observed had they not been pointed out as the traces of what was said to have been a very evident eruption a few days before. There was nothing worthy of notice in this case.

No. 3. C. T—, a young man, æt. 20 (No. 8 in Mr. Hutchinson's first series). On one arm was the cicatrix of the vaccination, only one place having taken. This was of a red colour, not very dark, and felt hard when pinched from side to side. On the body and arms, and more especially on the abdomen, there was seen a general mottling or staining of the skin. The rash was slightly darker than the surrounding healthy surface, but was not raised. This was said to be the remains of a rash which was well marked a few days previously. No other symptoms.

No. 4. W. W—, a young man, æt. 18 (No. 10 in Mr. Hutchinson's first series). He had a rash similar to that seen in the preceding case but more defined. All over the body and shoulders there were distinctly defined blotches of a brownish colour. These were evidently the remains of a fading rash, which was said to have been very distinct. The remains of a nearly healed ulcer in the throat were to be seen.

No. 5. H. H—, A young man, æt. 22 (No. 9 in Mr. Hutchinson's first series). Covered with a rash resembling that

seen in the preceding case, but still more marked. On passing the hand over the surface it felt somewhat raised as if disposed to be lichenous. The tonsils were much enlarged, red, and injected. This enlargement is probably of old standing.

In the last three cases the eruption might be styled erythematous, whilst in this case it was disposed to be also papular.

SAMUEL WILKS.

These cases were seen by members of the Committee on three separate occasions, which accounts for the differences in the several reports.

When, however, the history of the patients is taken into consideration, and the symptoms presented by them at the different periods of time, we can entertain but little doubt that they have been the subjects of constitutional syphilis.

SAMUEL WILKS,
WM. S. SAVORY,
GEO. G. GASCOTEN.

On September 4th, 1871, I saw a female, æt. 18. No. 4 of Mr. Hutchinson's first series. She had a large and tender swelling on the left side of the neck, beneath the angle of the jaw. There was a large excavated ulcer on the right tonsil; there were a few faintly marked scaly copper-coloured spots about the bend of the elbow. On the right arm were three marks of vaccination of a light copper colour. The patient complained of pains in her forehead. She seemed to be in good general health.

THOMAS SMITH.

I entirely agree with the above report, so far as it applies to this case, which was the only one of this group that I had an opportunity of examining.

THOMAS SMITH.

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